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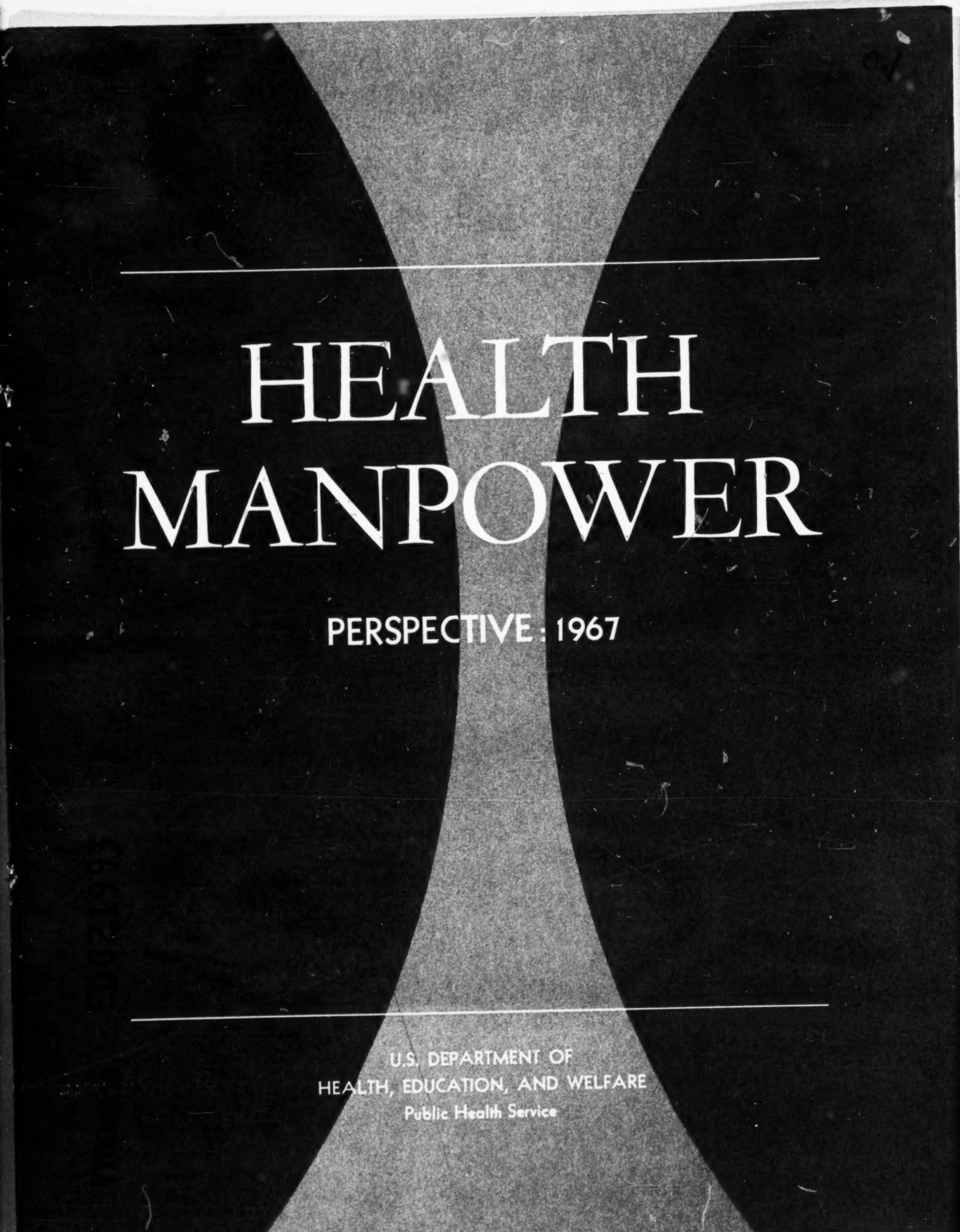
Despite sharp increases, the supply of health manpower continues to be outstripped by the demand while the need for 3,700,000 to 4,000,000 workers by 1975 is complicated by the serious demand for professional and technical workers and for leaders and teachers. Preparation for the health field has increasingly become the responsibility of universities, colleges, and vocational and technical schools, with 650 universities and colleges offering programs in one or more allied health occupations at the baccalaureate and graduate levels. In fiscal 1967, federal government expenditures for educating health service personnel, administered by seven government agencies, totaled about $400,000,000. Suggested approaches to the problem of the health manpower shortage include better utilization of school facilities and faculties, improved recruitment programs, greater attention to refresher programs, provision of career development opportunities and attention to advanced academic placement, greater focus upon continuing education, examination of the present utilization of health personnel as a basis for developing new types of health workers, more regional planning and improving pay and working conditions of health service personnel. Appendixes include a chart of federal aid available for training health service personnel. (JK)



HEALTH MANPOWER

PERSPECTIVE: 1967

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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Leonard D. Fenninger, M.D.
Director
Bureau of Health Manpower

Staff

Margaret D. West
Director
Office of Program Planning
and Evaluation

Marion E. Altenderfer
Cozette H. Barker
Marian L. Chase
Beatrice Crowther
Ruth R. Johnson

Special thanks are given to the members of the Health Subcommittee of the Departmental Task Force on Health, Education, and Welfare Manpower Requirements and Training Programs:

Philip R. Lee, M.D., *Chairman*
Assistant Secretary for Health and Scientific Affairs

George Silver, M.D., *Vice-Chairman*
Deputy Assistant Secretary for Health and Scientific Affairs

E. L. J. Grandpierre
Senior Program Planning Officer
Food and Drug Administration

William L. Kissick, M.D.
Director
Office of Program Planning and Evaluation, Office of the Surgeon General
Public Health Service

Arthur Lesser, M.D.
Deputy Chief
Children's Bureau
Welfare Administration

Joseph S. Murtaugh
Director
Office of Program Planning
National Institutes of Health

J. Warren Perry, Ph. D.
Deputy Assistant Commissioner for Research and Training
Vocational Rehabilitation Administration (resigned June 1966)

Donald Pilcher
Head, Research Grant Unit
Division of Research and Statistics
Social Security Administration (resigned September 1966)

Helen K. Powers
Chief, Health Occupations Unit
Division of Vocational and Technical Education
Office of Education

Andrew P. Sackett, M.D.
Deputy Chief
Bureau of Medical Services
Public Health Service (retired April 1967)

Francis N. Waldrop, M.D.
Director of Professional Training and Education
St. Elizabeth's Hospital

Mary Weaver
Program Analysis Officer
Office of Assistant Secretary for Program Coordination (resigned April 1967)

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Preface

We are at a time when scientific knowledge and technology are providing the means for improving the health of every member of our society and when education has made more people than ever before mindful of their health. The base on which the protection of health and the provision of care depend consists of the individuals who are engaged in the health occupations. Their preparation, the use of their skills, and the organizations and institutions in which they work have become matters of deep public concern.

At no time have the disparities between the expectations and need for health services and the capacity to supply these services been more obvious. The schools of the health professions and occupations, hospitals, public and private agencies, and those who work in the health occupations are all taxed beyond their capacities to render care and to protect the health of every member of our society.

Our information about the availability of knowledge and skills in the health field is incomplete and uneven. Our understanding of the most appropriate ways in which to prepare those who are undertaking careers in health is limited. We have conducted few studies and experiments in the organization and delivery of health services and care.

This report brings together information of significance to those who are responsible for education in the health professions, in the development of new knowledge, and in the organization of health services. It also indicates areas in which we lack knowledge and capacity to prepare enough people who are committed to serve at the highest possible level. These people are essential if the health of all Americans is to be improved.

Although the tasks before us are formidable, the capabilities of our society are such that schools, institutions, and other public and private resources can accomplish much in all aspects of health. Sound knowledge, the effective deployment of scarce resources, improvements in education, and the attraction of able young people to all the occupations which make good health possible will bring significant progress toward the goal of good health for every one.

Chapter I

Summary

Medicine today offers great promise in the alleviation of human suffering. Our society is committed to the removal of the barriers which have kept many people from the fulfillment of this promise. Hospitals and other health facilities have been constructed. Financial barriers to the receipt of care are being removed. Today the critical need is for health manpower—the right numbers and kinds of people in the right places.

Our needs for physicians, dentists, nurses, and allied professional and technical workers exceed supply and present educational capacity. Long waiting periods for medical and dental care are common. There are hospital beds closed for lack of staff, and desperately overcrowded hospital emergency rooms. There are inadequate services for many children, for many of the aged, for the mentally ill, for the poor, and often for the middle aged and for the well-to-do. Health manpower resources are not distributed equitably in the different parts of the Nation. Lack of proper organization of services is a major weak link in our ability to meet health service needs.

There were about 2.8 million people in the health occupations in 1966; by 1975 another million will be needed. To reach this level, the present output of health workers probably should be doubled by 1975. The problem is not one of numbers alone, however. The extent to which a given number of people meet the needs will be determined in large part by the kind of education they receive, the places they work, and the organization of health services.

In numbers, our minimum goals for medicine and dentistry should be to increase school capacity to keep pace with the increase in the population from which students are drawn. This would mean increasing the entering medical school class from 9,300 in 1965 to 15,000 in 1975. In dentistry, a parallel goal would be to increase the number of entering students from 3,850 in 1965 to 6,400 in 1975. Under the stimulus of the Health Professions Educational Assistance Act, it is expected that 13 new medical schools and eight new dental schools will begin to operate within the next 10 years, but even this will not meet the total need. More new schools will be needed, and the output of existing schools must be further increased.

The output of nursing schools is increasing. This increase is taking place in the baccalaureate and associate degree programs. The output of the diploma (hospital) programs, which provide three-fourths of the graduates, has remained at essentially the same level for about 10 years. The movement toward preparation for nursing in educational institutions can be expected to continue. Greater effort must be directed toward bringing educational institutions and hospitals, each of which has an essential role in the preparation of nurses, into close working relations. The Nurse Training Act of 1965 and the Vocational Education Act both provide funds in support of the preparation of nurses. The graduation rate, 35,000 a year, should be increased to between 50,000 and 60,000 by 1975.

Increasing the output of educational programs for the other health professions will require the establishment of many new educational centers, an interdisciplinary approach which relates training levels and professions, and constructive working relationships between schools and hospitals. The passage of the Allied Health Professions Personnel Training Act in 1966 should make it possible to increase graduates at the baccalaureate level from 7,000 in 1965 to 14,000 by 1975.

Similar needs exist in technical and vocational education. These are being recognized by the increased allocation of vocational education funds to health manpower training, and by assistance available under the Allied Health Professions Personnel Training Act. These programs should double their output within the decade.

To meet the most immediate needs requires a substantial increase in short-term training programs for nursing aides and other auxiliary workers. The output of such programs should be doubled in the very near future. Plans for this are already well advanced, utilizing hospital funds and Federal funds available through the vocational education programs of the Office of Education, through institutional training programs under the Manpower Development and Training Act (administered jointly by the Labor Department and the Office of Education), through on-the-job training programs of the Department of Labor, and through special programs for health training funded by the Office of Economic Opportunity and administered jointly with the Department of Health, Education, and Welfare.

To add quickly to the effective supply of nurses and other professional workers, we must draw on the pool of women who have retired from the labor force. A nationwide program to recruit and provide refresher training for such workers should give substantial returns. A goal of retraining 30,000 nurses has been established for 1968 in a program which represents the cooperative efforts of the Department of Labor, the Veterans' Administration, the Public Health Service, and the Office of Education.

At every level, and probably for every occupational category, the need for teachers is of major importance. Another need in education for the health occupations is a careful and complete examination of the duties and functions of all health workers to determine what can best be done by each worker. Today many highly skilled health professionals spend too much of their time at tasks requiring much less education and skill than they possess, while, on the other hand, unskilled and poorly trained workers are often given tasks beyond their capabilities.

The development of better patterns of health manpower utilization is an urgent need. This will be a complex task. It will require attention both to job analysis and to education. Perhaps even more, it will require the development of new patterns of organization for the provision of health services.

Planning for the future, to assure the availability of comprehensive health services and an adequate supply of health manpower, will require major efforts by regions, States, and communities, by public and private agencies, by educational and health service institutions, and by the Federal Government. The Bureau of Health Manpower of the Public Health Service is the Federal agency with primary commitment to the goal of meeting the Nation's health manpower needs.

Chapter II

Present Supply and Needs

Advances in medical science have produced a vast and satisfying array of services that the American public have come to appreciate and to seek. These advances have been accompanied by greater availability of health facilities, by the lowering of financial barriers to service, by the growing conviction that adequate health care should be available to all people, and by rising income and educational levels. Hence there is greater demand for medical care today than is readily available. In providing health services, the critical factor has become health manpower.

Admittedly, there are serious shortages in supply, maldistribution of facilities and services, and inefficient use of health manpower. Many people are struggling with approaches toward measuring these shortcomings, but none of the many estimates can adequately measure the total need or demand. Even if it were possible to envision the ideal staffing for health services for a community, for a State, or for a whole nation, the continuing development of new knowledge and techniques, new patterns of service, and new methods of payment are all constantly changing the needs for both numbers and varieties of health workers.

Trends in Supply

The rising level of education in the United States and the rapidly advancing technology have contributed significantly to higher standards for health services. They have helped also to increase the manpower potential for meeting those standards. It is less than 15 years since service workers began to outnumber farm workers and "white collar" workers to outnumber "blue collar" workers. A significant aspect of this changing employment picture has been the increase of workers in the health occupations (fig. 1).

Persons in the health occupations constituted 1.2 percent of the civilian labor force in 1900; 2.9 percent in 1960. By 1966, 3.7 percent of the labor force (2.8 million persons) were engaged in the health occupations (table 1). Of the 2.8 million persons engaged in health professions and occupations in 1966, over 1 million were physicians, dentists, and nurses (table 2).[1] There were 17,000 optometrists, almost 8,000 podiatrists, and 25,000 other health workers (including an estimated 20,000 veterinarians) trained at the doctoral level.

Between 1950 and 1966, while the population of the United States increased by 29 percent, the number of workers in the health occupations increased by over 90 percent. The increases were very uneven among occupational categories. The number of physicians increased by 34 percent; the number of professional (registered) nurses increased by 71 percent, and practical nurses by 119 percent. The number of active dentists increased by 22 percent during the same period. Among professional workers, the greatest percentage increases were in the relatively newer occupational groups, such as occupational therapists, and medical technologists. Each of these groups more than doubled in the 16-year period. The detail by occupation is shown in table 3.

In most of the occupational groups, the increases reflect substantial increases in school capacity. In medicine, however, the population ratio has been maintained only because of the large-scale immigration to the United States of physicians educated in foreign medical schools. In 1965, almost 1,700 of a total of 8,900 newly licensed physicians—about 19 percent—

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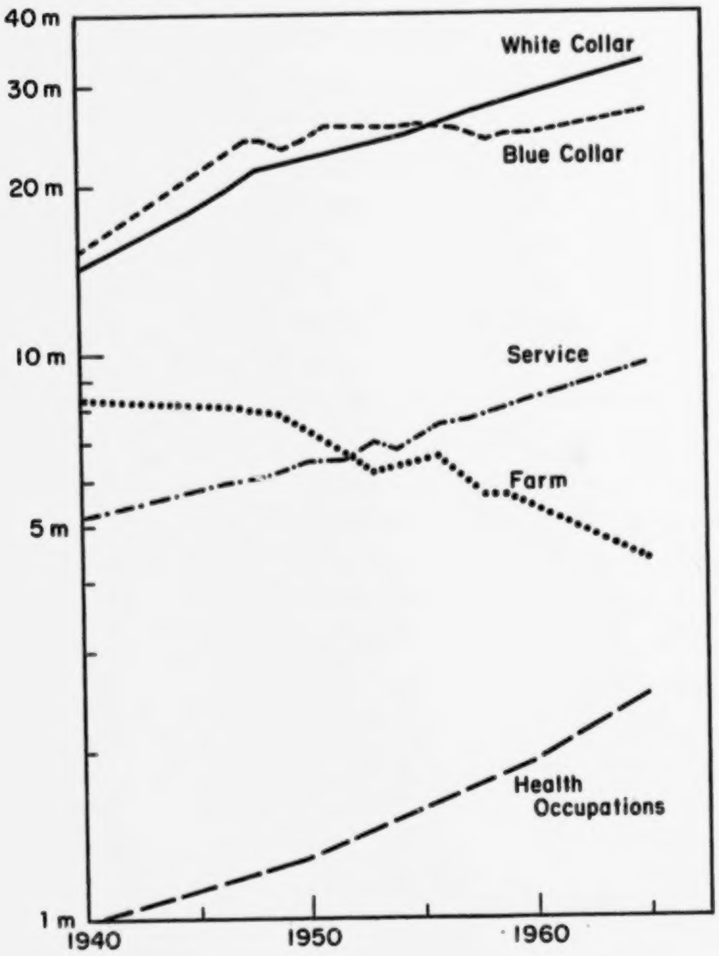
[1] "Health occupations" includes all those in the health professions and occupations, some of whom the Census Bureau does not include in the health services industry (industrial physicians employed by the aircraft industry or pharmacists employed in drugstores). This definition does not include persons in the health services industry but not in the health occupations (secretaries, mechanics, laundry workers, and others).

Figure 1. Employment in health occupations in relation to major occupational groups: 1940–65.



Semilog scale: Equal slopes represent equal rates of increase.

were graduates of medical schools in Canada and other foreign countries. In 1950, only 500 of the new licentiates were foreign graduates. By 1965, 27 percent of interns and residents in U.S. hospitals were graduates of foreign medical schools as compared to 10 percent in 1950 (appendix table 1).

Foreign-trained nurses also contributed a significant percentage of the total. In 1964, 2,850 of the 36,088 licenses issued (almost 8 percent) were to graduates of nursing schools in Canada and 66 other foreign countries—more than four times the number in 1950. An estimated 18,000 professional nurses practicing in 1966 were graduated from foreign nursing schools, almost 3 percent of the total number of professional nurses in practice.

Appendix table 2 shows trends in the number of immigrants in selected health occupations admitted to the United States.

The pronounced trend toward specialization in recent decades has affected all health service personnel, producing more than 30 recognized medical specialties and eight dental specialties. Between 1950 and 1963, the proportion of private medical practitioners in specialty practice increased from about 35 percent to more than 60 percent (fig. 2). Specialty practice is developing rapidly in nursing, also. Technology is continually creating new types of allied health specialties.

With medical practice increasingly specialized, with equipment and facilities more complex and costly, and with the population shifting toward urban centers, health care has become more and more institutionalized.

A total of 1.7 million people were employed by hospitals in 1960, an increase of 70 percent over the 1950 hospital employment level (appendix table 3). Much of this was increase in nursing staff. Between 1941 and 1966, the number of registered nurses employed by hospitals increased by almost 350 percent, practical nurses by over 750 percent, and aides, orderlies, and attendants by over 300 percent (table 4). This was an increase from 16.5 nursing personnel per 100 beds in 1941 to 59.4 in 1966.

With growing institutionalization, there has also been a great increase in the number of people who are employed in the health industry, but are not considered as having a health occupation—cooks, secretaries, janitors, to name a few. There are estimated to be over a million such workers.

Figure 2. Specialization of physicians (M.D.) in private practice: 1950-63.

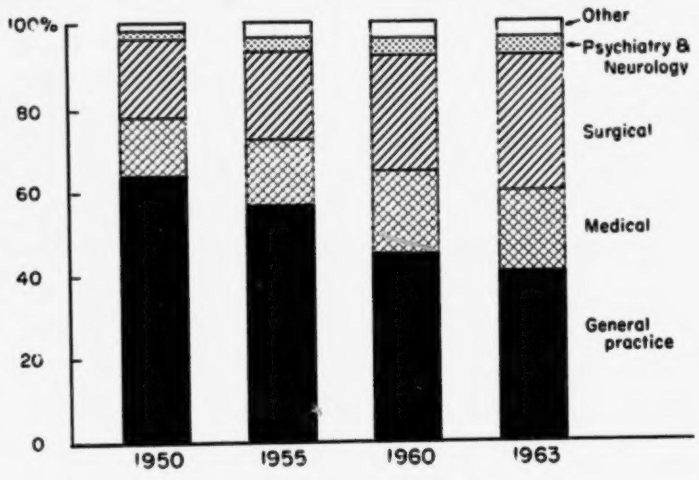


Table 1.—Persons in the health occupations in relation to the civilian labor force: 1900–75

Year	Civilian labor force [1]		Percent in health occupations
	Total	In health occupations [2]	
1900	29,030,000	345,000	1.2
1910	37,291,500	500,000	1.3
1920	42,205,700	650,000	1.5
1930	48,685,600	900,000	1.8
1940	51,742,000	1,090,000	2.1
1950	62,208,000	1,440,000	2.3
1960	69,628,000	2,040,000	2.9
1966	75,770,000	[3] 2,786,000	3.7
1975	89,083,000	[3] 3,800,000	4.3

[1] For 1900–30, data include civilian gainful workers 10 years of age and over; for 1940, data include persons 14 years of age and over in the experienced civilian labor force; for 1950–75, data include persons 16 years of age and over in the civilian labor force.

[2] Includes those occupations identifiable from decennial census data. The inclusion of such additional groups of health workers as those in environmental health, secretaries and receptionists in physicians' offices, and retired physicians and dentists would raise the figure for 1966 by 200,000 to 300,000. These additional groups are included in reference (1).

[3] Estimated on the basis of Public Health Service and Bureau of Labor Statistics projections.

Source: U.S. Bureau of the Census. "Occupational Trends in the United States: 1900 to 1950." Bureau of the Census Working Paper No. 5. Washington, U.S. Department of Commerce, 1953, 29 pp.

Prindle, Richard A., and Pennell, Maryland Y. Health Manpower Source Book 17. "Industry and Occupation Data From the 1960 Census, by State." Public Health Service Pub. No. 263, sec. 17. Washington, U.S. Government Printing Office, 1963, 104 pp.

U.S. Department of Labor. "Manpower Report of the President." Transmitted to the Congress April 1967. Washington, U.S. Government Printing Office, 1967, 285 pp.

Demands for Medical Care

Over the past quarter of a century, the American people have substantially increased their use of medical services. In 1930, Americans saw a physician an average of two or three times a year; by 1964, the average had reached 4.5. Hospital bed use has shown a similar increase. Annual admissions to general hospitals rose from 56 per 1,000 population in 1930 to 145 per 1,000 in 1964; average hospital days from 0.9 to 1.3 per person per year. In 1966, nursing care of the sick at home was available in areas where 69 percent of the population lived; in 1963, only 56 percent of the people were in areas with such service. (These figures substantially understate the increase in service, since there has been a great increase in the complexity and intensity of care.)

The reasons for increased use of medical services are many. Among them are a greater number of older people with their increased burden of chronic disease, a higher level of appreciation as to the values of medical service, higher levels of general education which have made Americans more aware of human needs, and the increasing availability of money for health services. The increasing urbanization of the population which increases the accessibility of medical services also adds to the demands.

Total expenditures [2] for health and medical care rose from $12.9 billion in 1950 to about $40.0 billion in 1965, an increase of more than 210 percent. Between 1950 and 1966, health expenditures increased from 4.6 percent of the gross national product to about 6.0 percent. By 1975, the Bureau of Labor Statistics estimates that this proportion (in 1965 constant dollars) may reach 6.5 percent (*3*). On a per capita basis, health expenditures have almost doubled, from $111 in 1950 to $209 in 1965, when figures are adjusted for changes in the purchasing power of the dollar (*4*). By 1975, (*5*) health expenditures may increase to nearly $68 billion or $304 per capita.

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[2] Expenditures for education of medical and health workers outside the hospital, estimated at $600 million in 1963–64 by the National Commission on Community Health Services (2), are not included in these overall figures.

Higher costs of medical and health care reflect not only greater use of services and drugs and the availability of increased services, but also substantial increases in salaries and wages, advances in quality, staffing increases, and changes in the content of services.

Public expenditures for health and medical care in 1964 represented about one-fourth of total expenditures; private expenditures accounted for the remainder. These proportions have remained fairly constant since 1950, but will change to show an increase in the Federal share when the impact of the 1965 Social Security Amendments, including medicare and title XIX, becomes apparent in financial reports.

Technological changes require more and better trained manpower. The National Commission on Technology, in a report published in 1966 (*6*), called for "broader and bolder use of the computer and other new health technologies," suggested that "technologically sophisticated ways of efficiently screening large numbers of people to detect abnormalities" be developed, and deplored the failure to train new categories of manpower for functions now performed by highly skilled, scarce professional personnel.

A multitude of new and complex instruments and concepts are on the threshold of wide application: automated laboratory devices and physiological monitoring, among others.

Table 2.—Supply of health workers, by level of training: 1966

Level of training and occupation	Number of persons
Total	2,786,200
Physician, dentist, other doctoral level	442,400
Physician (M.D. and D.O.)	297,000
Dentist	95,400
Optometrist	17,000
Podiatrist	8,000
Other	25,000
Nurse (baccalaureate, diploma, associate degree)	640,000
Other occupations which may have baccalaureate or postbaccalaureate preparation	422,000
Dental hygienist [1]	16,000
Medical record librarian	12,000
Medical technologist [2,3]	40,000
Occupational therapist	6,500
Physical therapist	12,500
Speech pathologist and audiologist	13,000
Radiologic technologist [3]	72,000
Pharmacist	120,000
Other	130,000
Other 1–3-year post-high school	531,800
Certified laboratory assistant	1,500
Cytotechnologist	3,300
Dental assistant	95,000
Dental laboratory technician	27,000
Inhalation therapist	5,000
Practical nurse	300,000
Other	100,000
Short training	750,000

[1] Some baccalaureate, primarily 2-year programs.

[2] ASCP registered. Hospitals reported 22,000 employed in 1966 who were not ASCP registered.

[3] Both baccalaureate and less than baccalaureate.

Source: Estimates prepared by the Bureau of Health Manpower based on: "Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp.

Table 3.—Number of persons active in selected health occupations: 1950–66

Occupation	1950	1960	1966
Physician:			
M.D.	209,000	243,100	285,900
D.O.	12,700	14,200	11,100
Dentist	77,900	89,200	95,400
Dental hygienist	6,500	11,400	16,000
Dental assistant	55,200	83,000	95,000
Podiatrist	6,400	7,600	8,000
Nurse—R.N.	375,000	504,000	640,000
Practical nurse	137,000	206,000	300,000
Home health aide	500	(1)	6,000
Medical technologist [2]	13,900	30,000	40,000
Occupational therapist	2,000	5,000	6,500
Radiologic technologist	30,800	60,000	72,000
Pharmacist	(1)	117,000	120,000

[1] Data not available.

[2] ASCP registered. Hospitals reported 22,000 employed in 1966 who were not ASCP registered.

Source: "Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington U.S. Government Printing Office, 1966, 182 pp., and Bureau of Health Manpower.

In the last 20 years, medical science has made greater strides than in all its previous history. Of the drugs prescribed today, the majority were unknown 10 years ago. The increasing number of feasible medical procedures (for example, cardiovascular and neurological surgery) has greatly increased the number of conditions now effectively treatable.

Demands are expanding in two directions—toward intensification and toward broader coverage. Examples of public concern can be seen in both directions. The regional medical center approach to heart disease, cancer, and stroke looks toward intensification of care for certain diseases, while the programs of the Office of Economic Opportunity are attempting to bring medical care to groups of people whose access to services has been particularly limited. These two examples represent the expanding needs which society must satisfy—and which at the same time represent new demands for both numbers and kinds of health workers.

Needs for Health Manpower

Many social, economic, and technological factors affect demands for health services. Population growth and change in age composition are significant. The 15 years from 1965 to 1980 are expected to bring an increase of 50 million in the Nation's population, including 5 million more people over 65 years old and 2 million more babies. The following tabulation shows some of the significant demographic changes that are anticipated. (More detail is shown in appendix table 4.)

	In thousands		
	1965	1975	1980
Total population	194, 600	223, 800	243, 300
Births per year	3, 800	5, 300	6, 000
Number of children under 15	59, 900	65, 300	72, 800
Number of persons 65 and over	18, 200	21, 200	23, 100

These population increases will bring substantial increases in needs. The 65-and-over age group, according

Table 4.—Nursing personnel in hospitals: 1941–66

Year	Total	Nurse—R.N.[1]	Practical nurse	Aide, orderly, attendant
Number of persons:				
1941	218,800	81,700	17,300	119,800
1946	292,800	146,600	(2)	[3] 146,200
1950	450,500	179,700	49,900	220,900
1955	635,600	260,900	65,800	308,900
1959	749,800	306,600	95,900	[4] 347,300
1966	1,003,600	361,000	150,600	492,000
Rate per 100 beds:				
1941	16.5	6.2	1.3	9.0
1946	20.4	10.2	(2)	[3] 10.2
1950	30.9	12.3	3.4	15.2
1955	39.6	16.3	4.1	19.2
1959	46.5	19.0	6.0	[4] 21.5
1966	59.4	21.4	8.9	29.1

[1] Excludes private duty nurses.

[2] Included with aide, orderly, attendant.

[3] Includes practical nurses.

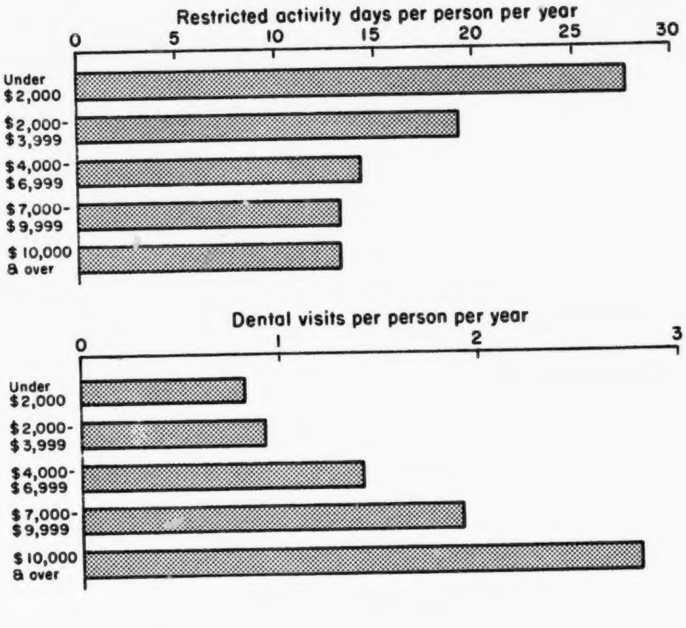
[4] Includes ward maids.

Source: Annual hospital numbers of J.A.M.A. Annual guide issues of Hospitals. Unpublished data from American Hospital Association. Public Health Service—American Hospital Association Survey of Manpower Resources in Hospitals.

to the National Health Survey, receives twice as much service from physicians as the total population and uses over twice as many days of hospital care annually as the total population. Older people average 8.7 days per year in nursing homes, plus almost 1 day in chronic disease hospitals. A recent study of nursing care given in the home showed that 36 percent of the caseload consisted of patients over 65 years of age.

That more and better health care is needed for low-income families has been repeatedly demonstrated. The National Health Survey shows a direct correlation between low income and poor health (7). Members of families with annual incomes below $2,000 had more than twice as many days of restricted activity because of illness as those in families with incomes over $7,000 (*8*). This comparison is shown in figure 3. At the same time, low-income families receive the least medical and dental care. Where family income was below $2,000, 59 percent of the family members had consulted a physician at least once during the preceding

Figure 3. Relationship between family income and disability and receipt of dental care.



12 months, as against 73 percent where the family income was $10,000 or higher. Dental appointments per person per year were more than three times as numerous in the $10,000-or-more income group as in the under-$2,000 income group (*9*).

Mortality rates reflect differentials in health status between the white and nonwhite populations. In 1964, the maternal mortality rate for the U.S. white population was 2.2 per 10,000 live births; for nonwhites, 9.0. For Negroes living in Mississippi it was 14.1. In 1964, the mortality rate for infants (under 1 year) was almost twice as great for nonwhite (41.1) as for white infants (21.6). The average life expectancy at age 20 was 48 years for nonwhites and 53 years for whites.

The problem of measurement of demand for physician services has been approached thoughtfully by Fein in a recent publication (*10*). He estimates that, between 1965 and 1975, population growth; changes in the age, sex, and social distribution of the population; urbanization; and migration might together raise total demand for medical services by 13.9 to 16.3 percent. He estimates further that rising levels of income and education might add another 7.0 to 7.5 percent to demand; and Medicare another 1 or 2 percent. The total increase in demand from all of these factors is placed at 22 to 26 percent.

The estimated increase of 19 percent in the supply of physicians (or 13 percent in the absence of new foreign-trained physicians) would not be sufficient to meet the increased demand, he continues, in the absence of a rise of productivity. It would certainly not be sufficient to take into account the impact of new medical discoveries, rising expectations on the part of the public, shifts to hospital-centered medical care, and increased availability of services.

Shortages of Health Manpower

There are a number of estimates of current and future shortages of manpower to meet the needs for personal health services. The term "shortages" means many things to many people. One concept is the difference between the supply and the number needed to meet a minimum standard established by a profession. This is often above what the community is willing or able to provide.

This section describes the need for health manpower primarily as it is perceived by health professionals.

Physicians

The total number of active physicians (doctors of medicine and doctors of osteopathy) in 1966 was 297,000. The ratio of physicians to population has remained steady for some years, but that fact, considered alone, is misleading. Actually, as the number of physicians giving their time to teaching, research, administration, and other activities has risen, the ratio of physicians who provide personal health services has declined, and the growth of specialty practice has sharply affected those who do administer personal health services. In 1965, the ratio of physicians in private practice who devoted themselves to family medicine (general practitioners, internists, and pediatricians) had fallen to 50 per 100,000 population as against 76 per 100,000 in 1950 (appendix table 5). In 1959, the Surgeon General's Consultant Group on Medical Education found the existing ratio of physicians to population "a minimum essential to protect the health of the people of the United States" (*11*).

According to the New York Times, the Board of Trustees of the American Medical Association reported at the annual convention in June 1967 that the nation's shortage of physicians was reaching "alarming proportions," and called for an "immediate and unprecedented increase" to meet the need (*12*). Shortages in individual medical specialties are eloquently evidenced in the series of quotations from professional journals which appear in Appendix C.

A review of the quantitative and qualitative aspects of the problem of physician shortage was published early in 1967 in the *Journal of Medical Education* (*13*).

How can the need be quantified? Looking at present standards or patterns of service, we find that prepayment group practice plans provide service with average staffing ratios of a little more than 100 physicians per 100,000 population. This is exclusive of interns and residents in hospitals. (Appendix table 6.) While the total staffing of any group is affected by the extent to which it uses optometrists, psychologists, nurses, and a variety of physician assistants, the group practice ratio is the best available approximation of personal health care needs today.

Using this ratio, and considering all physicians in private practice to be the universe of physicians giving personal health care, we can estimate that in 1966 there was an unmet need for some 20,000 practicing physicians. In addition, the shortage of psychiatrists was estimated at between 10,000 and 15,000. Hospitals reported needs for some 10,000 additional interns and residents. Teaching, research, medical administration, military service, and public health all have significant unmet needs. When these and other needs are taken together, total requirements today are probably about 50,000 more than the supply.

Meeting these needs, plus those of the increased population, would require some 400,000 physicians by 1975, on this basis. The output of U.S. medical schools at presently planned levels, even with the continued immigration of foreign physicians, will provide no more than 360,000 physicians by 1975, a figure far short of meeting estimated needs.

Dentists

There were about 95,400 active dentists practicing in the United States in 1966, a ratio of 48 per 100,000 population. The 1959 report of the Surgeon General's Consultant Group on Medical Education (*11*) found serious shortages, and estimated that a doubling of output would be required to maintain the then-current ratio of dentists to population. The Commission on the Survey of Dentistry (*14*) in 1961 likewise anticipated that, even if school capacity could be expanded sufficiently to halt the declining ratio of dentists to population, there would still be a serious shortage of dentists in relation to the needs in the late 1970's.

Estimates prepared by the Division of Dental Health, Bureau of Health Manpower indicate a need for 136,800 dentists by 1975, including those needed for teaching and research. Even with the increased number of student places expected as a result of the expansion of existing schools and the establishment of new schools, the number of active dentists in 1975 is expected to be about 106,000, leaving a deficit of about 30,000.

Nurses

An estimated 640,000 nurses were practicing in the United States at the end of 1966; about one-fourth of these worked only part time. The Division of Nursing, Bureau of Health Manpower, estimates that an additional 135,000 nurses are currently needed.

According to the Surgeon General's Consultant Group on Nursing (*15*), 850,000 nurses would be required by 1970 to provide safe, therapeutically effective, and efficient care. Based on the same criteria, 1 million registered nurses would be required in 1975. It is estimated that by 1975 the supply will be between 800,000 and 900,000.

The number of practical nurses has increased at a rapid rate. Between 1950 and 1965, the total more than doubled. The supply in 1966 was 300,000. In 1966, hospitals reported needs for some 41,000 more practical nurses, and needs in extended care facilities were estimated at 9,000. Thus, present unmet needs are probably not less than 50,000. The total need by 1975 may reach 550,000, with the expected supply of 450,000. This is largely an older group, so that a large loss can be anticipated in the next decade.

The trend in the number of registered nurses employed in various fields is shown in appendix table 7.

Allied Health Workers

There is a great variety of allied health workers with a range of preparation from graduate university to a few weeks; all are in great demand under the pressure of new technologies. Studies in five fields—medical record library science, medical technology, occupational therapy, physical therapy, and radiologic technology—indicate that, from the professional viewpoint, needs are about double the present supply.

A 1966 study of hospital staffing needs (see below) shows that hospital administrators also see substantial immediate needs in these, as in many other occupational fields:

	Hospital employment	Additional needed for optimum care	Percent additional
Medical record librarian	6, 300	1, 800	29
Medical technologist	54, 500	9, 200	17
Occupational therapist	4, 100	2, 300	56
Physical therapist	8, 500	2, 900	34
Radiologic technologist	24, 000	3, 900	16

Dental hygienists, dental laboratory technicians, and dental assistants are needed in vastly increased numbers, to enable dentists to make the most effective use of their knowledge and skills.

Home health aides have increased from about 500 in 1950 to an estimated 6,000 in 1966. Many more will be needed to provide services under the medicare program. A minimum estimate is for an immediate need for 8,000 to 10,000 such aides. Figures on the supply of these occupations are of varying degrees of accuracy and reliability. The best figures available are included in table 2.

Institutional Needs

To provide "optimum care"[3], hospitals need 257,000 more professional and technical workers in addition to the 1,332,000 employed, according to findings of a 1966 study by the Public Health Service and the American Hospital Association (table 5).

The needs for optimum care represent an average increase of 19 percent. In general, the needs for professional workers are proportionately higher.

Nursing homes and other extended care facilities need to increase their present staffing total by about 12 percent to give "optimum care," according to preliminary findings of a study conducted by the Bureau of Health Manpower (table 6). In view of the serious shortage of nursing home beds, these figures probably understate the problem.

State Studies

In the past 4 years, studies of health manpower needs have been made in no less than 34 States by a variety of agencies, both public and professional (see appendix B). Some of these studies have been concerned with needs in one profession, others with the whole range of health services. Nearly all indicate severe shortages.

Regional Differences

The disparities among the States and regions in the supply of physicians and other health manpower have long been of concern. The East South Central States, with the highest infant mortality rate, have only 89 physicians per 100,000 population, in contrast to a rate of 171 for the Middle Atlantic States. There are similar disparities in the distribution of dentists and nurses (see table 7).

For dentists, the number per 100,000 civilians varies from 58 in the Middle Atlantic States to 31 in the East and West South Central States.

In relation to population, nurses are most numerous in the New England States (470 per 100,000 population) and fewest in the East South Central States (165 per 100,000).

Over the past 25 years, regional differences in health manpower supply have shown little change. This is in sharp contrast to hospital facilities. Disparities among the States in hospitals have been substantially reduced since first passage of the Hill-Burton Act, so that today the difference in the ratio of acceptable hospital beds to population between the Northeast and the South is less than 7 percent.

The difference in manpower supply between the regions with the highest and lowest ratios to population is greatest for professional groups and smallest for the groups which require the least training. The Middle Atlantic States have almost 90 percent more physicians and dentists in relation to population than the East South Central States, and the New England States have over 180 percent more nurses than the East South Central States. On the other hand, for practical nurses and for aides, orderlies, and attendants, the differences are only 31 and 45 percent.

Estimates of Department of Labor

The Bureau of Labor Statistics of the Department of Labor recently completed a study of health manpower requirements and supply which adds a further dimension to the assessment of demand (2). One section of the report deals with the health services industry—that is, all workers employed in hospitals, nursing homes, physicians' offices, and similar establishments. It includes projections as to requirements which "represent the effective demand for health workers on the basis of the stated assumptions as to the expected nature and composition of the economy, rather than needs to provide a

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[3] Each hospital's estimate of additional personnel needed on the basis of current services and patient load (exclusive of estimates of personnel needed to establish new departments or services).

Table 5.—Personnel needs in hospitals: 1966 and 1975

Category of personnel	Staff 1966	Additional needed to give optimum care 1966	Percent additional	Estimated total needed in 1975[1]
Total professional and technical	1,332,100	257,200	19	2,034,300
Nursing service:				
Nurse—R.N.	361,000	79,500	22	563,800
Licensed practical nurse	150,600	41,400	27	245,800
Surgical technician	17,600	3,900	22	27,500
Aide, orderly (except in psychiatric hospitals)	374,400	51,300	14	544,900
Aide, orderly in psychiatric hospitals	117,600	18,500	16	174,200
Diagnostic services:				
Medical technologist	54,500	9,200	17	81,500
Laboratory assistant	14,600	2,500	17	21,900
Cytotechnologist	1,600	500	31	2,700
Histologic technician	3,900	700	18	5,900
Electrocardiograph technician	5,900	800	14	8,600
Therapeutic services:				
Occupational therapist	4,100	2,300	56	8,200
Occupational therapy assistant	3,800	1,200	32	6,400
Physical therapist	8,500	2,900	34	14,600
Physical therapy assistant	5,200	1,100	21	8,100
Social worker	10,700	5,100	48	20,200
Social work assistant	1,500	500	33	2,600
Recreation therapist	3,800	1,600	42	6,900
Inhalation therapist	5,600	2,200	39	10,000
Speech pathologist and audiologist	1,200	500	42	2,200
Radiology:				
Radiologic technologist	24,000	3,900	16	35,700
X-ray assistant	6,000	900	15	8,800
Pharmacy:				
Pharmacist	9,400	1,900	20	14,500
Pharmacy assistant	5,600	900	16	8,300
Medical records:				
Medical record librarian	6,300	1,800	29	10,400
Medical record technician	10,100	1,800	18	15,200
Dietary:				
Dietitian	12,700	3,500	28	20,700
Food service manager	5,400	800	15	7,900
All other professional and technical	106,500	16,000	15	156,800

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[1] Estimated on the basis of present staff and additional needed to give optimum care, taking into account the expected increase (28%) in hospital beds between 1966 and 1975.

Source: "Manpower Resources in Hospitals—1966." Chicago, American Hospital Association, 1976, 75 pp.

Table 6.—Personnel needs in extended care facilities: 1966

Category of personnel	Present staff	Additional needed to give optimum care	Percent additional
Total professional and technical	275,000	31,900	12
Nuring service:			
Nurse—R.N.	31,000	6,000	19
Licensed practical nurse	33,600	9,400	28
Aide, orderly, attendant	177,400	10,700	6
Therapeutic services:			
Occupational therapist	1,600	800	50
Occupational therapy assistant	1,300	300	23
Physical therapist	2,000	1,200	60
Physical therapy assistant	900	300	33
Social worker	1,200	500	42
Recreation therapist	2,600	900	35
Speech pathologist and audiologist	300	400	133
Medical records:			
Medical record librarian	300	100	33
Medical record technician	800	100	12
Dietary: Dietitian	4,600	900	20
All other professional and technical	17,400	300	2

Source: Estimates for all known extended care facilities based on 499 returns in Public Health Service survey.

specific standard of medical care".[4] The report projects an increase of employment in the health services industry of about 45 per cent between 1966 and 1975 (from 3.7 to 5.35 million). Another section of the report includes labor market analysis and projections for selected health occupations. Taken together, these give a total increase in employment in the health occupations of slightly more than 1 million in the next decade (table 8). This accords with the need and with projections based on the "highest region." Furthermore the Bureau of Labor Statistics requirement projections were developed without taking into account possible limitations in the supply of health workers and therefore they are not predictions of what employment will actually be in 1975.

In general, this study forecasts fewer professional workers than the professions see as needed, and considerably larger numbers of workers with shorter training.

Employment projections for the health service industry made by the Manpower Administration of the Department of Labor (*16*) are for increases of equivalent full-time workers from 2.7 million in 1965 to 3.6 million by 1975, an increase of one-third. The detail of these estimates cannot be compared directly with estimates given elsewhere in this report because the latter involve persons in the health occupations whether or not employed in the health service industry.

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[4] The basic assumptions were: (1) A gross national product (GNP) in 1975 of over $1.0 trillion (in 1965 dollars); and (2) a resolution of the Vietnam conflict by 1970, with an international situation prevailing similar to the year or two immediately before the Vietnam buildup. Other major assumptions were that the economic and social patterns in our society, including patterns of consumption, will continue to change at about the same rate as they have in the recent past, and that the rate of scientific and technological advances of recent years will continue.

Table 7.—Selected categories of active health personnel per 100,000 population, by geographic division: various dates

Geographic division	Physicians (M.D.)[1] 1965	Dentists[1] 1965	Nurses—R.N. 1962	In hospitals, 1966	
				Practical nurses	Aides, orderlies
United States	132	45	298	79	258
New England	168	53	470	97	261
Middle Atlantic	171	58	376	81	286
South Atlantic	116	32	255	70	228
East South Central	89	31	165	78	210
West South Central	101	31	171	99	207
East North Central	120	45	286	68	269
West North Central	114	47	301	72	299
Mountain	115	43	307	78	223
Pacific	157	53	329	70	229

[1] Non-Federal per 100,000 civilian population.

Source: A.M.A. Directory Report Service, vol. 17, supplement No. 47. Chicago, American Medical Association, Jan. 3, 1966.

"Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp.

"The Nation's Nurses. The 1962 Inventory of Professional Registered Nurses." American Nurses' Association, 1965, 39 pp.

Unpublished material based on P.H.S.-A.H.A. survey of hospital manpower.

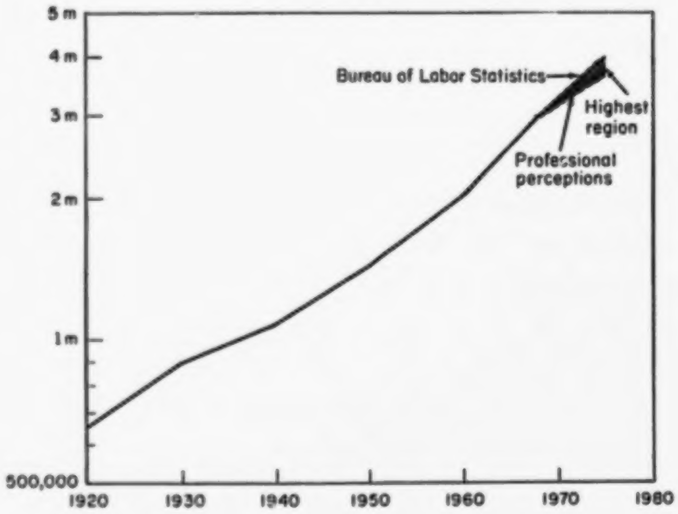
Summary

The supply of health manpower has increased sharply in recent years. Despite the great increases, demands for health services continue to outstrip the capacity to deliver services. The present outlook is that, in response to these demands, the supply will increase at an accelerated rate in the decade ahead. In 1966, there were 2.8 million workers in the health occupations; by 1975 the total is expected to reach betweeen 3.7 and 4.0 million (figure 4).

The proportion of the labor force engaged in the health occupations has increased from 2.3 percent in 1950 to 3.7 percent in 1966. It is expected to reach 4.3 percent by 1975.

Many estimates of health manpower needs have been made, and many methods have been used to arrive at those estimates. When this highly fractionated material is drawn together, however, the totals are very close together.

Figure 4. Persons in the health occupations: 1920–75.



Semilog scale: Equal slopes represent equal rates of increase.

Table 8.—Persons in the health occupations: 1966 and 1975 estimates

Category of personnel	Number of active workers 1966	1975 estimates		
		Professional judgments	Highest region [1]	Bureau of Labor Statistics projection
All categories	2,786,200	(3,735,000)	3,797,700	(3,977,600)
Physician (M.D. and D.O.)	297,000	400,000	425,000	390,000
Dentist	95,400	137,000	134,900	125,000
Dental hygienist	16,000	42,000	(2)	(2)
Optometrist	17,000	(2)	27,500	20,000
Podiatrist	8,000	(2)	17,500	9,000
Nurse—R.N.	640,000	1,000,000	964,500	860,000
Licensed practical nurse	300,000	550,000	429,700	465,000
Aide, orderly, attendant	700,000	500,000	814,600	1,080,000
Medical technologist [3]	40,000	70,000	52,400	75,000
Occupational therapist	6,500	54,000	12,500	19,500
Physical therapist	12,500	54,000	17,700	27,000
Speech pathologist and audiologist	13,000	29,000	18,400	(1)
Radiologic technologist	72,000	100,000	92,400	100,000
Pharmacist	120,000	(2)	162,700	126,000
Medical record librarian	12,000	16,000	12,100	18,000
All other	436,800	([4] 783,000)	[4] 615,800	([4] 666,100)

[1] Based on the 4 major regions of the United States.

[2] Separate data not available; included in all other.

[3] ASCP registered. Hospitals reported 22,000 employed in 1966 who were not ASCP registered.

[4] Estimated at the same rate of increase as the sum of the specified categories.

Source: Estimates prepared by the Public Health Service and the Bureau of Labor Statistics based on:
"Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp.

The figures drawn from professional sources indicate a total need of more than 3.7 million health workers by 1975 (table 8). A higher estimate, 3.8 million, is arrived at by projecting the present health manpower supply levels in the highest region to the total country in 1975. The Bureau of Labor Statistics projections, using an econometric model, indicate total 1975 employment in the health occupations of almost 4.0 million.

These projections are in line with long-range trends (fig. 4). Each would require a net increase of between 100,000 and 130,000 health workers a year in the decade ending in 1975, or a rate of increase 50 percent higher than that of the past decade.

The greatest challenge will be to meet the needs for professional and technical workers, and for leaders and teachers. It is in these groups that increases are the most expensive, the slowest, and the most difficult to achieve. And it is these groups that are the most critically needed to meet the objective of the best possible health services for all people.

Chapter III

Education for Health Services

Education for the health services must be viewed in the broad perspectives of changes in the total education system, its underlying concepts, and the changing educational aspirations of young people.

We are in a period of enormous gains in education. In one decade, the number of students in colleges and universities has doubled. Over 45 percent of all persons 18 to 21 years of age are enrolled in institutions of higher education. Academic standards have been raised. Support of research in academic institutions has multiplied.

Specialization has increased to the point where a student in any field has more and more difficulty in seeing the whole of which his specialty is a part. At the same time, decisions to specialize are being made earlier than ever before.

That adequate educational opportunity should be brought to all parts of the country is increasingly recognized, not only to provide opportunity to young people, but also to provide communities with the services of skilled workers. Students are showing more interest in having their education include a significant component of social participation. One striking evidence of this change is the popularity of the Peace Corps program.

With recent changes in education patterns have come many changes in education for health services. A basic one emerges from the increased general aspiration for a college education—or for the status and prestige afforded by a degree. Preparation for occupations for which training was previously limited to service institutions is, under pressure both from the professions and from educational institutions, increasingly centered in the college or university. This phenomenon is bringing new appraisals of education for the health services, in which the hospitals and clinical training play so important a part.

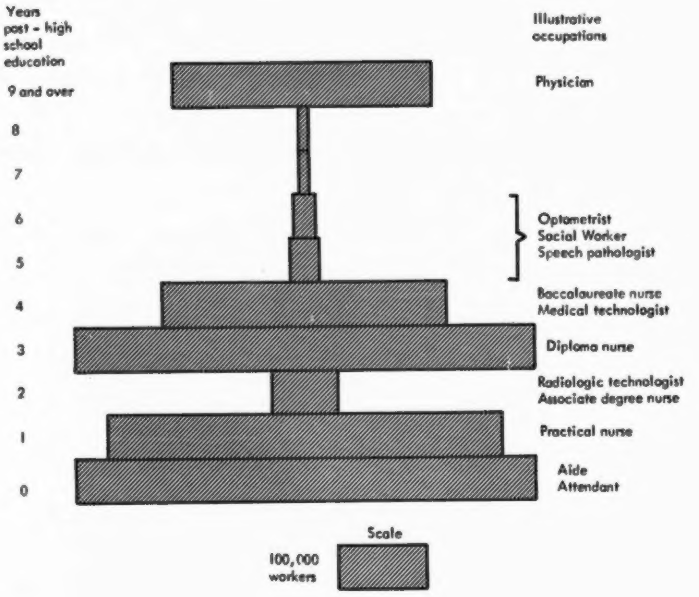
Constructive working relationships must be maintained between educational institutions and health service facilities of all types—hospitals, health departments, extended care facilities, group practice clinics, community health programs, and others. These facilities and programs provide clinical facilities for the student, traineeship experience for the graduate, and inservice education for the practitioner. The potentialities of hospitals for these purposes have been much better utilized than other service units or programs. To provide the student or trainee with experience in comprehensive health care, these other resources should be used more extensively.

Preparation for the health professions and services, in large part, has been outside of the mainstream of education in this country. In probably no other field of endeavor is there an educational pyramid like that of the health occupations. Today's general education pattern progresses through achievement levels such as high school graduation, 2 years of college, 4 years of college, and graduate education—each a stepping stone to the next. But in the health fields, the three largest occupational groups are medicine, with 12 years of post-high-school education; nursing, which has been almost entirely a 3-year post-high-school program, and practical nursing with 1 year of post-high-school education—and with no educational bridges between them. A dramatic view of this situation is given in figure 5.

Looking at the pool of young people from among whom recruits to the health occupations will come, we find that the number of college-age young people has experienced a recent spurt of growth representing, of course, the post-World War II baby boom. Another spurt is expected between 1970 and 1975, reflecting the jump in births in the mid 1950's.

Year	Number of 18-year-olds
1960	2,606,000
1964	2,772,000
1965	3,729,000
1970	3,677,000
1975	4,112,000
1980	4,194,000
1985	4,337,000

Figure 5. The medical services pyramid.



There will not only be more young people, but more of them will seek to continue their education past high school. Twenty years ago, only 1 in 4 continued his education past age 17. Now it is 1 in 2 (appendix table 8). And the proportion still grows.

Education for the health fields is discussed in the following pages in these groupings: Medicine, dentistry, nursing, allied health occupations with baccalaureate or postbaccalaureate preparation, other post-high-school preparation, and short or inservice training. Changing programs, standards, and definitions make it impossible to keep to neat categories, but in general the grouping follows that of table 2, chapter II. Appendix table 9 indicates trends in output for selected health occupations.

Medicine

There are 91 schools of medicine and five schools of osteopathy in the United States. Together they produce some 8,000 graduates a year. Most students enter medical school after 4 years of college. Then follow 4 years of medicine and usually a year of internship and 2–5 years of residency training in a field of specialization. Thus, the young man or woman who enters medical school in 1967 will not be graduated until 1971, and will not begin practice until 1974 or later.

The length of this program has given rise to considerable concern, and some medical schools are experimenting with such changes as: Fusing the 4 years of college and the 4 years of medical school into a 6-year program that would omit some of the premedical science courses and strengthen clinical curriculums, integrating internship and residency training, shortening unnecessarily long residencies, and expanding continuing education programs for practicing physicians (*1*).

A number of medical schools have identified as planning needs the recognition of individual aptitudes and of individual differences, time to pursue knowledge in an area of individual interest, development of curriculums responsive to the different interests and backgrounds of students, giving greater responsibility to students, and recognition that medical schools today are educating men and women for a variety of careers (*2*).

One concern is the rather general detachment of medical education from the community, except in the clinical setting of the teaching hospital. Because of greater awareness of both educational and social needs, programs are being developed to bring medical students into more meaningful contact with people outside of hospitals, in the context of expanding community health services.

There were 9,300 admissions to medical and osteopathic schools in 1965. Although the number of entrants has increased in recent years, the proportion of young people who enter medical school has declined. In 1960, of each 1,000 young people, 3.9 entered medical school. By 1970, the proportion will have dropped to 3.2 per 1,000 (table 9). To maintain the 1960 ratio of admissions would require 15,400 first-year places in 1975. The problem is one of school capacity, rather than the number of applicants. There are now, as there have been for some years, two applicants for every available place in our medical schools. This situation seems likely to continue.

Twelve new medical schools are in various stages of planning. The need for increased medical school capacity cannot be met by new schools alone. The lead time required for planning, construction of facilities, assembly of a faculty, and graduation of an initial class is nearly 10 years. Thus in addition to the initiation of new schools, the output of existing schools must be sharply increased.

Table 9.—Admissions to medical and dental schools in relation to young people: 1955–65 and 1966–75 estimates

Academic year	Number of 20-year-olds	Medical school admissions[1]		Dental school admissions	
		Number	Rate per 1,000 20-year-olds	Number	Rate per 1,000 20-year-olds
1955–56	2,136,000	8,206	3.8	3,445	1.6
1960–61	2,281,000	8,794	3.9	3,600	1.6
1965–66	2,791,000	9,223	3.3	3,806	1.4
1966–67	2,765,000	9,600	3.5	3,942	1.4
1970–71	3,492,000	11,000	3.2	5,000	1.4
1975–76	3,993,000	14,500–15,000	3.6–3.8	5,600	1.4

[1] Includes schools of osteopathic medicine.

Source: U.S. Bureau of the Census. "Current Population Reports." P–25, Nos. 286, 311, and 314. Washington, U.S. Government Printing Office, 1964 and 1965. "Health Manpower Source Book 18. Manpower in the 1960's." Public Health Service Pub. No. 263, sec. 18. Washington, U.S. Government Printing Office, 1964, 67 pp.

Estimates of admissions by Bureau of Health Manpower.

In view of the great need on the one hand, and the difficulties of rapid expansion of capacity on the other, a reasonable goal for admissions to medical schools in 1975 would be in the range of 14,500 to 15,000. This would bring the relative opportunity for young people to enter medicine near to the 1960 level. It would provide approximately 13,000 to 13,500 graduates in 1979.

In looking to the expansion of medical school capacity it is important to remember that there are sharp variations in the financial as well as the physical capacity of individual schools, and that for a fair number of schools the most urgent problem is the development of a firmer base to support the present teaching load.

The capability of existing schools with well-established standards of quality to handle substantial increases in enrollment, and the methods and and costs of such expansion, have not been adequately explored. Such explorations are strongly urged in a recent report on medical education, the "Coggeshall Report" (*3*). According to this study, "there has tended to be great reliance on tradition in adhering to prevailing enrollments and limited consideration given to ways of serving larger enrollments."

Dentistry

There were 49 dental schools in the United States, with a total of 3,200 graduates in 1965. In 1950, the number of graduates was only 2,500. Although students may be admitted to dental school after 2 years of college, in academic year 1965–66 nearly 50 percent of the dental students had earned a bachelor's degree before entering dental school, and another 30 percent had completed 3 years of predental work. A growing number of dentists are taking advanced training beyond the dental degree, which includes clinical training as interns or residents and academic training as graduate or postgraduate students.

Dental education is faced with the same problems as other professional fields. For many years, the curriculum was oriented toward providing students with the technical training and knowledge to serve those individuals who sought private dental care. From admissions procedures through advanced training, the emphasis was on identifying the individual who could practice dentistry as a "solo" practitioner. Dental education is being challenged to revise the program to educate dentists to practice within the community. This includes services to patients in all income brackets and ranging from children's clinics to a geriatric service. Dental schools are expanding their training to include clinical experiences which will give students the opportunity to practice dentistry in the context of a community and with the assistance of auxiliaries.

In dentistry, as in medicine, school capacity is not increasing as fast as the student potential (table 9). There were 3,800 entrants to dental schools in 1965. By 1975, to maintain the 1960 ratio of places to young people would require increasing the size of the entering dental school class to 6,400. The present estimate is for 5,600 entering students in that year. In addition to the 49 dental schools in full operation, 5 are in various stages of planning or operation.

The growth in dental schools and the increase in dental knowledge over the past 20 years has created problems. To staff new and expanded dental schools, additional faculty (already in short supply) will be needed, and curriculums, which are already crowded, will have to be reorganized so that sufficient emphasis may be placed upon new subject areas. Rapid advances in educational technology will force changes in the basic character of dental education. These changes will necessitate corresponding changes in teaching facilities.

The expected increase in the number of dentists, coupled with the need for greater productivity through efficient use of dental auxiliaries, underlines shortcomings in the latter's educational facilities, although facilities for such training have grown markedly since the early 1960's. The number of dental hygiene schools has increased from 47 to 58 since 1962, schools for dental assistants have increased from 33 to 84, and schools for dental laboratory technicians have increased from five to 10.

Dental hygienists are required to complete at least 2 years of preparation beyond high school for an associate degree or the basic certificate. The bachelor's degree with a major in dental hygiene requires 4 years. Relatively few dental assistants and only a small number of dental laboratory technicians have had technical training. Accredited programs for training dental laboratory technicians, which must be at least 2 years in length, have just begun to be established. Dental assistant training programs, which must be at least 1 academic year in length, have been in existence for a longer time. Recently, many new 2-year programs leading to a certificate or associate in arts degree have been established in community and junior colleges.

Nursing

There are now some 1,200 schools in the United States preparing students to become registered nurses. Together they produced 35,125 graduates in 1966. Registered nurses are prepared in three types of programs: A 4- or 5-year program leading to a baccalaureate degree, a 3-year program in a hospital leading to a diploma, and a 2-year associate degree program, usually based in a community college.

These programs vary in the nature of the academic content and the amount and kind of clinical practice; however, all prepare individuals to take the same licensure examination for registered nurses. The common denominator of all initial programs is emphasis on nursing practice; differences among the types of program depend upon the depth and extent of their objectives. Those nurses with a baccalaureate degree are prepared to enter graduate programs in the various functional areas and clinical specialties.

Education in nursing at the masters or doctoral level, like graduate study in general, includes specialization, independent study, critical understanding, and a research orientation, as well as the specific characteristics of professional education in which knowledge is directed toward use in the service of society.

As nursing education has moved, and is moving, into the general stream of post-high-school education, the contribution of academic institutions is growing rapidly. The nursing profession has taken the position that education of nurses should take place in institutions of learning within the general system of education (4). The trend from training supported by service agencies to education in an academic institution is an important one in terms of improvement in quality and quantity. It is also one which requires the most constructive relations between college and hospital.

While the output of diploma programs has remained about constant for the past decade, increase in total output reflects the growth of the baccalaureate and associate degree programs (fig. 6).

Over a 5-year period the decrease in the number of diploma programs has been more than offset by the increase in associate degree and baccalaureate programs:

Type of program	Number of programs 1959–60	Number of programs 1964–65
Registered nurse:		
Total	1, 136	1, 158
Associate degree	48	130
Diploma	918	840
Baccalaureate degree	170	188
Practical nurse	661	984

During the period of transition, the number of graduates to meet needs of practice must be maintained. Further, a balance must be maintained between the numbers of admissions to professional and technical programs. In view of these changes and developments it is important that potential nursing students select the appropriate program with regard for capability, interest, and career advancement.

Practical nurses are prepared in programs which are generally 1 year in length and are administered through the public vocational school system or are under hospital control. These programs prepare workers who, under the supervision of a registered nurse or physician, share in giving direct care to patients in situations relatively free of complexity.

Between 1960 and 1965 admissions to programs for practical nurses increased more than 55 percent while admissions to programs for registered nurses increased only 23 percent. The actual numbers of admissions were:

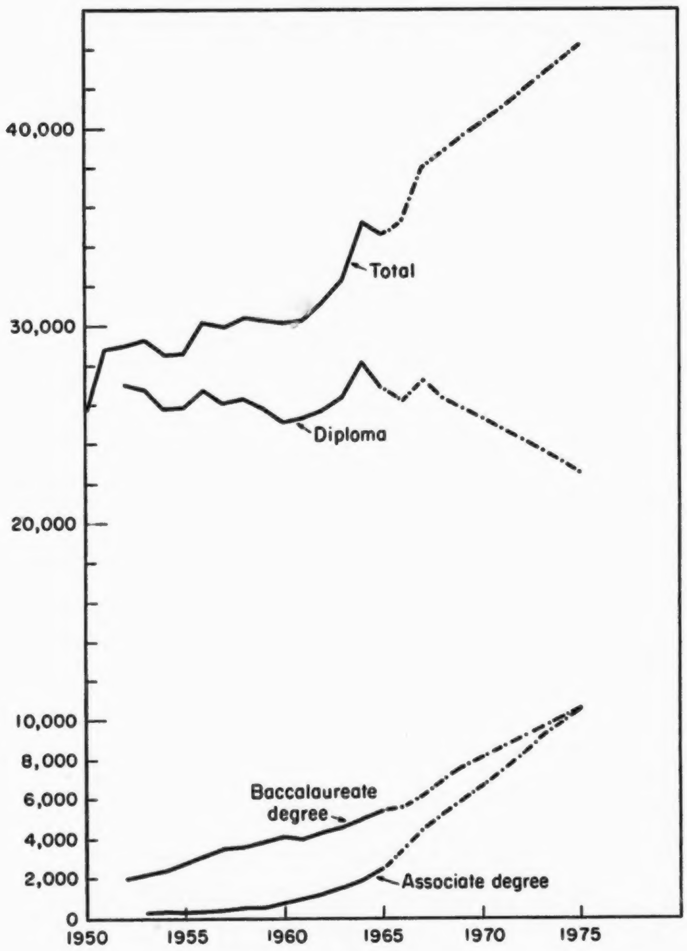
Type of program	Admissions to nursing programs 1960	Admissions to nursing programs 1965
Registered nurse:		
Total	49, 500	60, 700
Associate degree	2, 100	8, 600
Diploma	38, 700	38, 900
Baccalaureate degree	8, 700	13, 200
Practical nurse	25, 000	38, 800

The rapid growth of baccalaureate and associate degree programs is apparent from these figures. However, even should this trend continue, it is probable that for some time a majority of the entrants to nursing will come through the diploma and practical nurse programs.

Young people enter registered nursing education programs at a rate of 17.4 per 1,000 persons age 18 (table 10). Looking ahead, it may be possible to increase admissions from 61,000 in 1965 to 87,000 by 1970 and to 94,000 by 1975. This would require that the proportion of young people entering nursing schools rise to somewhat above the 1955 level. Total output of nursing schools might then increase from the present 35,000 a year to 47,000 in 1970 and 62,000 in 1975. This could take place only with significant increases in faculty and facilities.

The output of practical nurses is expected to increase substantially in the next decade.

Figure 6. Number of graduates of schools of nursing: 1950–65 and estimates to 1975.



Semilog scale: Equal slopes represent equal rates of increase.

Optometry

There are 10 accredited colleges of optometry in the United States. They all have or are authorized to begin a 6-year curriculum leading to a doctor of optometry degree (O.D.) with 2 years college and 4 years of professional optometry education. During the year 1964–65, 406 graduates were awarded the O.D. degree.

Table 10.—Admissions to nursing schools in relation to young people: 1955–65 and 1966–75 estimates

Academic year	Number of 18-year-olds	Admissions to nursing school		Nursing school admissions per 1,000 18-year-olds				
		Registered nurses	Practical nurses	Registered nurses				Practical nurses
				Total	Baccalaureate degree	Diploma	Associate degree	
1955–56....	2,176,000	45,209	15,526	20.8	3.2	17.4	0.2	7.1
1960–61....	2,652,000	49,487	24,955	18.7	3.3	14.6	0.8	9.4
1965–66....	3,794,000	60,701	38,755	16.0	3.5	10.2	2.3	10.2
1966–67....	3,572,000	62,000	44,000	17.4	3.9	10.4	3.1	12.3
1970–71....	3,739,000	87,000	60,000	23.3	6.3	11.3	5.7	16.0
1975–76....	4,180,000	94,000	75,000	22.5	6.6	9.8	6.1	17.9

Source: U.S. Bureau of the Census. Current Population Reports. P–25, Nos. 286, 311, and 314. Washington, U.S. Government Printing Office, 1964 and 1965.

"Health Manpower Source Book 2. Nursing Personnel." Public Health Service Pub. No. 263, sec. 2 (revised). Washington, U.S. Government Printing Office, 1966, 113 pp.

Estimates of admissions by Bureau of Health Manpower.

Pharmacy

There are 73 accredited colleges of pharmacy in the United States. At least 5 years of study beyond high school are required to obtain a bachelor's degree. Some colleges of pharmacy require a minimum of 2 years of college for admission. Over 12,350 students were enrolled in the last 3 years of pharmacy colleges in the fall of 1965 and 3,360 students were graduated during 1964–65.

Podiatry

The five colleges of podiatry in the country admit students who have completed at least 2 years of college. The subsequent 4 years of training lead to a degree of doctor of podiatry (Pod.D. or D.P.) or doctor of podiatric medicine (D.P.M.). In the academic year 1964–65, the 5 colleges enrolled 625 students and graduated 112.

Veterinary Medicine

There are 18 approved schools of veterinary medicine in the United States. The minimum time required to earn the degree of doctor of veterinary medicine (D.V.M.) is 6 years beyond high school. This period consists of 2 to 4 years of undergraduate college study and 4 years of veterinary medicine. In the academic year 1965–66, there were 4,119 students enrolled in the approved schools, of whom 910 were expected to graduate that year.

Other Allied Health Professions

Much of the preparation for the allied health professions today is carried on in rather small, independent programs in colleges and hospitals. From an educational viewpoint, some of them are excellent, but many still—despite noticeable progress on the whole—pose problems which appear to be inevitable because of small size, lack of adequate educational support, and parochialism. A summary of allied health programs is included in table 11.

More than 650 universities and colleges offer specialization in one or more of the allied health occupations at the baccalaureate and graduate levels. The greatest number of programs (539) is in medical technology. The next largest groupings are baccalaureate degree nursing (229) and speech therapy (152). Smaller numbers of programs are offered in radiologic technology, medical record library science, social work, occupational therapy, and physical therapy. Of the 476 colleges and universities without medical schools offering medical technology programs, 287 have no other programs in the health field, while 189 offer at least one other health curriculum.

These programs are offered both in academic institutions and in hospitals, and at all academic levels—universities with medical schools, colleges, junior colleges, vocational educational institutions, and hospital schools. In most instances, a major problem is a lack of methods for crediting education received at one academic level or in one type of institution toward additional education or career advancement.

There is today, as never before, the opportunity to bring educational institutions into new and increasingly constructive relationships with hospitals and other service facilities. The success of these efforts will affect the quality of education and of health services, and will be a major determinant of the extent to which young people will undertake careers in health fields and of the opportunities of such young people to build flexible and challenging careers.

Two questions must be considered: (1) How can the university or college best build effective groupings, or working relations, among these related but generally separated programs which are being placed in the academic setting, but which must maintain strong clinical components? (2) How can meaningful educational patterns be developed to prepare young people with a wide range of interests and capacities for growing and changing opportunities in the health careers?

A recent, important development has been the growth of schools of the allied health professions. More than a dozen universities have established or are now developing, such interdisciplinary programs. These developments should go far to offset the parochial nature of much of the educational effort in these fields, and to mitigate the often built-in obsolescence of training. Such educational grouping makes it possible to prepare together individuals who will later work together—a factor often missing from the training of health workers. The coordinated and supervised clinical experience provides students with an understanding of the interactions of all of the health fields in providing patient care.

The organization of these schools and of the curriculums offered vary considerably. Important among the fields included are medical technology, radiologic technology, physical therapy, occupational therapy, and medical record library science. In these schools the program in nursing is a part of, or closely related to, the school. Dental hygiene programs are usually found in the same universities, but related primarily to the dental school.

The curriculums of the first 2 college years usually emphasize liberal arts and science, perhaps with introduction to the health occupations. The last 2 years of the baccalaureate programs include both core courses, which are common to several health-related fields, and professional specialization.

In addition to the universities with schools of allied health professions, some 50 other universities with medical schools offer multidiscipline programs of education for the health professions. Other universities are moving in the same direction.

Many of these universities have other substantial programs to prepare students for health services—speech therapy in schools of education, dietetics in departments of home economics, and schools of nursing, pharmacy, podiatry, and optometry. These schools often prepare technicians for supportive roles.

University centers with medical schools and graduate departments in the sciences, engineering, and psychology are able to offer combinations of courses leading to advanced degrees in fields related to health.

Table 11.—Educational programs in selected health occupations, by category of personnel and type of institution: 1965

Category of personnel	Type of institution[1]								
	Total	University with medical school	Other university[2]	4-year college	Junior college	Technical or vocational school	Secondary school	Hospital or laboratory	Independent school
Physician (M.D. and D.O.)	93	78	......	......	......	......	......	......	15
Dentist	49	45	4	......	......	......	......	......	......
Optometrist	10	3	2	......	......	......	......	......	5
Pharmacist	75	39	30	[3] 2	......	......	......	......	[3] 4
Veterinarian	18	6	12	......	......	......	......	......	......
Medical record librarian	29	11	3	8	......	......	......	7	......
Medical technologist	692	63	127	349	19	......	......	133	1
Occupational therapist	32	21	6	5	......	......	......	......	......
Physical therapist	42	37	2	......	......	......	......	3	......
Speech therapist	152	43	53	56	......	......	......	......	......
Dental hygienist	55	29	7	3	15	......	......	......	1
Radiologic technologist	693	44	17	29	31	......	......	572	......
Social worker	60	44	15	1	......	......	......	......	......
Nurse	1,170	63	64	102	123	......	......	781	37
Cytotechnologist	75	26	......	......	......	......	......	48	1
Inhalation therapist	25	1	......	......	4	......	......	20	......
Dental assistant	94	7	3	3	47	30	......	2	2
Dental laboratory technician	11	2	1	......	3	5	......	......	......
Laboratory technician, assistant	147	2	......	......	10	16	......	118	1
Practical nurse	1,002	1	7	9	133	549	60	232	11
Medical assistant	43	......	1	1	28	13	......	......	......
Medical record technician	14	......	......	......	2	......	......	12	......
Surgical technician	12	......	......	......	1	5	......	6	......
Dietitian's assistant	4	......	......	......	2	1	......	1	......
Podiatrist	5	......	......	......	......	......	......	......	5

[1] Includes institutions in 50 States, District of Columbia, and Puerto Rico.

[2] Either offering doctoral or master's degree and having a program in liberal arts with 1 or more professional schools.

[3] Includes 1 not accredited.

Source: Compiled from data in: "Health Resource Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp. and unpublished sources.

Some of these are bioengineering (college of engineering and physiology department in the medical school), biostatistics (department of mathematics and medical school), radiobiology (department of physics and medical school department of radiological science), and clinical psychology (psychology department and medical school psychiatry department).

Multidiscipline educational centers can provide more effective teaching, with better use of teaching staff and facilities than single-discipline schools. They make possible better working relationships among members of the health team, and provide a setting for experimenting with new kinds of training to meet changing needs.

Education for the allied health professions should be more closely geared to medical and dental education. In addition to conducting training in the same clinical centers, emphasis should be given to the interrelationship and supportive role of each of the allied health professions in providing patient services.

A more detailed discussion of education for the allied health occupations appears in the report of the Allied Health Professions Education Subcommittee of the National Advisory Health Council (*5*).

Graduates of educational programs for the allied health professions at the baccalaureate and master's level totaled about 7,000 in 1965. It should be possible to double this output within 10 years.

Technical and Vocational Programs

Vocational schools have given considerable attention to the health services for many years. As early as 1950, vocational schools were preparing some 2,000 practical nurses annually. Today, these schools prepare students for more than a dozen health ocupations. In recent years, technical and vocational programs have developed into several patterns and levels. Most important for education for the health occupations has been the development of 2-year community college and technical institute programs and of programs in vocational schools and comprehensive high schools, usually 1 year in length.

In the past, most of the health occupation programs in these institutions have been operated as independent entities, with little or no interrelationship. Increasingly, however, interdisciplinary programs are being developed, with some common core curriculums and the sharing of instructors, classes, facilities, libraries, clinical resources, and other educational services. Such an interdisciplinary center provides one location and one administrative group, to which health agencies in the community may communicate the needs of the community and thereby influence the training of students and the placement of graduates. These programs are proving effective in producing the kinds and quality of workers needed for the variety of occupations in the health field. Further, such centers give the trainees the opportunity to select from a number of health occupations and to be counseled into the career for which their capabilities are best suited.

The Office of Education, in cooperation with the Public Health Service, is developing programs to assist secondary schools to strengthen the health component in curriculums by providing students with educational experiences in hospitals and other health agencies. The programs encourage students to explore career opportunities in the field of health. Such programs are an integral part of the high school curriculum, although they are in addition to the students' academic courses.

Junior Colleges and Technical Institutes

The 2-year community junior colleges are introducing and experimenting with programs for health technicians. The associate degree programs most frequently offered are for nursing, radiologic technology, dental hygiene, dental assistance, medical assistance, and medical laboratory assistance. Other 1- or 2-year programs are for medical secretary, practical nurse, medical office assistant, dental laboratory technician, medical record technician, and occupational therapy assistant.

In the junior colleges, allied health programs require a basis of general educational courses on which the technical courses build rather directly. Some courses cut across departmental lines and are intended for all persons engaged in the health field. Clinical experience, utilizing the clinical facilities of nearby hospitals and health agencies, should be central to each of the programs. Ideally, the students' clinical laboratory experiences are chosen, directed, and evaluated by instructors to maximize the educational benefits of each laboratory period.

Vocational and Comprehensive High Schools

The largest health service preparation programs of the vocational schools are those which prepare practical nurses. The size and rapid growth of these programs has been discussed earlier (p. 20). As a more recent development, some of the practical nurse programs have been expanded to multidisciplinary programs offering preparation for health service. Such programs have been developed under the sponsorship of State and local boards of education in Massachusetts and Wisconsin. Others are being developed elsewhere, including Arizona, Florida, Pennsylvania, South Carolina, and West Virginia.

An outstanding example of a multidisciplinary center offers seven postsecondary-school programs to train students in allied health occupations. Clinical experience is gained in community hospitals. Cooperative hospital-school externship agreements with community affiliating agencies make it possible for students to correlate theory and practice with supervised clinical experience. The curriculum is established and revised through the recommendations of an advisory committee representing community business, industry, dental and medical professions, and hospitals. Their guidance keeps the program attuned to the medical needs of the community.

In extending the technical and vocational health programs, priorities should be given to programs in geographic areas experiencing the most acute personnel shortages. To promote a higher caliber of training and to make the best use of available teaching and classroom resources, the development of interdisciplinary training centers for several technical health occupations should be encouraged. Emphasis should be placed on training those personnel who are in shortest supply and who tend to remain in the health field.

In these programs, as in most others, the lack of qualified faculty is the greatest handicap with respect to both the quantity and quality of output. Programs for technical workers in community colleges, technical institutes, and vocational schools should, with increased financial assistance, more than double their present output within a decade. The annual output of practical nurses should be increased from the present 25,000 to not less than 40,000. Other occupations for which substantial increases are projected include surgical technicians, medical laboratory assistants, dental assistants, and medical office assistants.

Hospital Programs

The role of the hospital as a training institution has been changing over the past decades. Once the primary training ground for many health occupations, it is increasingly the locus of clinical training and experience, as technical schools, colleges, and universities play greater roles in the education of health personnel. With educational demands increasing, these institutions have accepted broad educational responsibility, while the hospitals retain the vital role of providing the clinical setting which is essential to the total educational process. The development of strong and constructive relationships between a school and its teaching hospital is essential to a good educational program.

Hospital training activities related to the allied health occupations can be categorized in three areas. They provide basic education for students enrolled in its own programs, clinical experience for students of health-related occupations in affiliated educational institutions, and inservice training for its own staff, especially for new employees.

Hospitals provide basic education for many health-related occupations, and clinical experience for many more. There are 781 hospital programs for nurses and 572 for radiologic technologists. Others include practical nurses (232), medical technologists (133), laboratory technologists (118), inhalation therapists (20), and cytotechnologists (48). Medical record technicians, surgical technicians, medical record librarians, and dietitians' assistants are represented by fewer than 20 programs each. (Table 11.)

In some programs, both didactic and clinical training are under the direct supervision and responsibility of the hospital staff. Examples of such programs are those for cytotechnologists, inhalation therapists, medical record technicians, and radiologic technologists.

The clinical portion of most baccalaureate, associate degree, and technical programs is provided in a hospital setting, in affiliation or cooperation with the educational institution. Usually this follows a prescribed academic program in the educational institution, with clinical experience supervised in part by faculty from the affiliated school.

In a few major cities, the boards of education and the hospitals have established joint pilot programs for the short-term training of allied health workers.

Some hospitals have extensive training and refresher programs for health occupations under the Federal Manpower Development and Training Act, as well as under their own auspices.

Military Training Programs

Within the Department of Defense, each of the three services trains medical corpsmen, laboratory assistants and technicians, medical record personnel, dental auxiliary workers, and many other allied health workers. The basic curriculum of study for hospital corpsmen requires up to 20 weeks for completion. The corpsmen receive most of their patient-care training after the completion of basic school, through on-the-job training in hospitals and dispensaries. After completion of on-the-job training, a corpsman may be assigned to a technical specialty school.

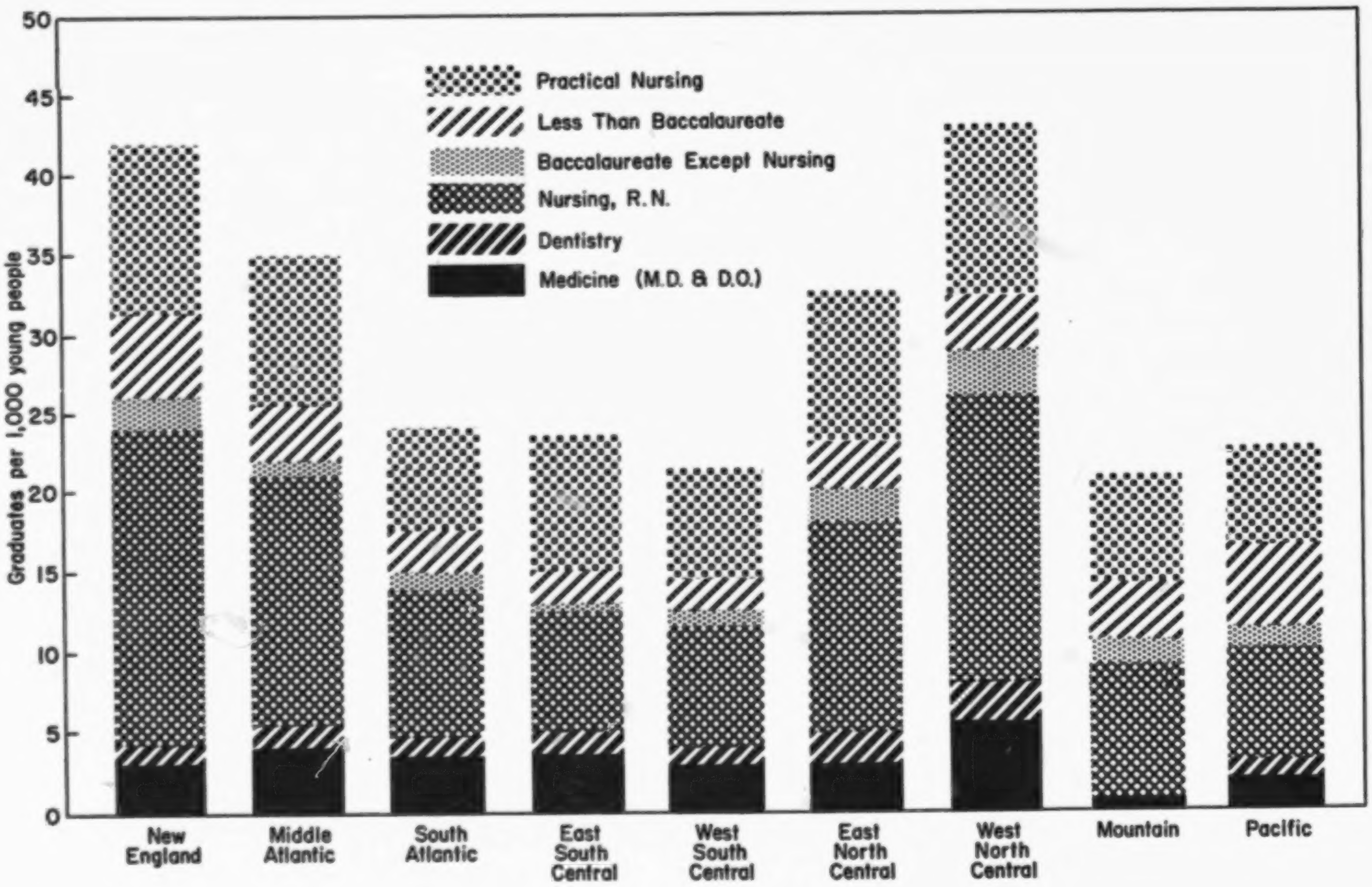
Regional Distribution of Educational Opportunity

There are wide variations among the regions of the United States in the opportunity to enter the health occupations. In relation to young people, the greatest opportunities are found in the New England and West North Central States.

State figures for 1965 for graduates in medicine, dentistry, nursing, practical nursing, and certain allied health occupations have been grouped by geographic division and related to the number of young people at the appropriate age level to give a summary picture of educational opportunity. (Appendix tables 10 and 11.)

Preparation for one of these selected health occupations was completed by 43 of every 1,000 young people in the West North Central States and by 42 in the New England States. At the other extreme, only 21 per 1,000 completed such preparation in the West South Central and Mountain States. These figures are shown, by occupational group, in figure 7.

Figure 7. Graduates of programs in selected health occupations in relation to young people in each geographic division: 1965



The total supply of health manpower in each region is affected both by the availability of educational opportunity and by interstate migration. In general, the greatest beneficiaries of health manpower migration are the Pacific and Mountain States; the greatest exporters of health manpower are the West North Central States.

On a regional basis, the relationship between educational capacity and supply of personnel is closest for nursing, practical nursing, and the allied health occupations. Migration has a much greater effect on the regional distribution of physicians and dentists than on those occupations with a shorter preparation.

Summary

The length of the educational preparation for the health occupations ranges from 8 years after high school (plus internship and residency training) for medicine and dentistry, through 4-year baccalaureate programs for such occupations as medical technology and occupational therapy, 2-, 3-, and 4-year programs for registered nurses, 1- and 2-year training for dental assistants, practical nurses, and others, to on-the-job training for aides and other health workers. Preparation for the health occupations is increasingly the responsibility of universities, colleges, and vocational and technical schools. However, a large part of the responsibility is carried by hospitals.

There are 91 schools of medicine, five schools of osteopathy, 49 dental schools, and some 1,200 schools preparing registered nurses. Over 650 universities and colleges offer programs in one or more allied health occupations at the baccalaureate and graduate levels. In addition, there are many hospital programs in medical technology, radiologic technology, and similar fields, and technical and vocational school training of shorter duration.

Many of the universities with medical and dental schools are developing schools of allied health which bring together the educational programs for a number of health occupations. This development offers great opportunity to strengthen the working relationships of physicians, dentists, nurses, and the other members of the health team, and to make it possible for various members of the team to learn to work together as they learn the fundamentals of their occupations.

Chapter IV

Federal Aid for Educational Programs

The Federal Government aids in the education of health service personnel through a number of programs. In fiscal year 1967, expenditures for this purpose totaled about $400 million, almost three-quarters of which was for extramural educational aid (aid to individuals or institutions outside the Government). The remainder was for intramural or direct Federal training (e.g., in military and veterans' hospitals).[1]

This report is concerned primarily with the major extramural programs that support basic occupational education; i.e., education for entrance into the occupation, as distinguished from specialized or advanced training. Several key programs are administered by the Public Health Service. Other agencies providing such aid include the Department of Labor, the Office of Economic Opportunity, the Office of Education, the Vocational Rehabilitation Administration,* and the Welfare Administration.* (These programs and also selected specialized training programs are described in some detail in appendix A.)

Public Health Service

The Public Health Service aids education for the health occupations primarily through the training programs of the Bureau of Health Manpower. The National Institute of Mental Health has training programs for its own field of interest, and other parts of the Service support training related to their special missions.

Bureau of Health Manpower

Major programs of the Bureau of Health Manpower provide support for basic occupational education under the Health Professions Educational Assistance Act of 1963[2] as amended, the Nurse Training Act of 1964[3] as amended, and the Allied Health Professions Personnel Training Act of 1966.[4] The Bureau also administers programs related to graduate and specialized training of public health personnel.

Health professions educational assistance.—Under the Health Professions Educational Assistance Act, the Bureau supports the basic professional training of physicians, dentists, optometrists, pharmacists, podiatrists, public health personnel, and veterinarians. It aids institutions through grants for constructing teaching facilities and for improving educational programs (i.e., aid toward faculty salaries and other operating costs). Under the act, low-cost loans and scholarships are made available to needy students through the respective schools.

In fiscal year 1967, aid under the Health Professions Educational Assistance Program totalled an estimated $204 million. This estimate includes $135 million for construction grants, $30 million for basic and special educational improvement grants, $35 million for student loan support, and $4 million for scholarships.

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[1] In addition, the Federal Government in 1967 spent about $200 million for medical research training and other training not related to personal health services, making a total of over $600 million for the education of medical and health personnel in general (*1*).

[2] P.L. 88–129, approved Sept. 24, 1963; 42 U.S.C. 293–293h.

[3] P.L. 88–581, approved Sept. 4, 1964; 42 U.S.C. 296–296c.

[4] P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h.

*Note: The Social Rehabilitation Service was established on August 15, 1967, to carry out the functions of the Welfare Administration, the Vocational Rehabilitation Administration, the Administration on Aging, and the Mental Retardation Divison of the Bureau of Health Services of the Public Health Service.

Construction grants under this program, since the first awards were made in 1964 through March 1, 1967, will result in 1,252 additional first-year places for students in medical schools, 589 in dental schools, 352 in schools of public health, and 1,131 in other types of schools covered by the act, at a total cost to the Government of $253.6 million. With the help of the program, nine new medical schools have been established, and 35 existing medical schools will have been modernized or expanded.

The $30 million available for educational improvement grants in 1967 represented about 95 percent of the amount needed to satisfy the statutory formula for basic improvement grants ($25,000, plus $500 times the number of full-time students) to the 170 eligible schools of medicine, osteopathy, dentistry, optometry, and podiatry. Of the funds requested for basic improvement grants in 1967, about three-fifths supported teaching staff, and the remainder was used for other expenses of alleviating the most critical weaknesses in educational programs. Funds were not available for special improvement grants, since the total appropriation was needed to fund the basic grants.

Funds are provided for special improvement grants in 1968, which will be made on a project basis to assist schools in providing for specialized functions which the schools perform and in improving instruction programs in ways not otherwise possible.

The Health Professions Student Loan Program, designed to help capable students regardless of their economic status, assisted about 21,000 students of medicine, osteopathy, dentistry, and other health professions at a cost of $25.3 million in fiscal year 1967. As originally authorized in 1963, the program made available Federal capital contributions to school loan funds of up to 90 percent of the total. Amendments in 1966 provided separate student-loan revolving funds and authorized $10 million in 1967 for them. (See appendix A.)

The scholarship program, although enacted in 1965, went into effect in fiscal year 1967. It provides grants to schools of the health professions for scholarships of up to $2,500 a year to students from low-income families. In 1967, scholarships were awarded to some 2,000 students of medicine, osteopathy, dentistry, optometry, pharmacy, and podiatry. Increases are planned for succeeding years.

Nurse training.—The professional nurse training program of the Bureau of Health Manpower helps to build nursing schools and provides for nursing student loans, project grants for improving nurse training, payments to diploma nursing schools, opportunity grants (scholarships), and traineeships for graduate nurses preparing to be administrators, teachers, supervisors, and clinical specialists.

Nursing school construction grants, approved and funded through April 30, 1967, will provide for 2,240 additional first-year places for students at a total cost of $31.4 million in Federal funds. Of the 2,240 places, 1,304 are in baccalaureate and graduate, 369 in associate degree, and 567 in diploma programs.

The Nursing Student Loan Program, which follows the same general pattern as the program under the Health Professions Educational Assistance Act,[5] supported about 17,000 nursing students in fiscal year 1967, at a cost of $16.9 million. An additional $2 million was appropriated for revolving funds. An estimated 20,000 students are expected to receive aid in fiscal year 1968.

Project grants for improving nurse training, totaling $4 million in 1967, are enabling schools to improve the content of their courses, develop new teaching techniques, make the best use of teachers, and otherwise improve the quality of education.

Formula payments to help diploma nursing schools defray the cost of training federally sponsored students went to 383 schools in 1967, at a total cost of about $3 million. Payments are being used, among other things, to add faculty, increase faculty salaries, expand library holdings, and purchase new educational aids and equipment.

The opportunity grant (scholarship) program for nurses was established by 1966 amendments to the Nursing Training Act.[6] Designed to open nursing education to young people who could not otherwise afford to pursue a nursing career, the program will go into full operation in fiscal year 1968, when an estimated 6,750 students will receive grants at a total cost of about $5 million.

In fiscal year 1967 an estimated 2,000 nurses will have received long-term traineeships for advanced training for teaching, supervision, administration, and clinical specialties. More nurses were trained in short-term courses. The traineeship programs, first established by the Health Amendments Act of 1956,[7] and extended and expanded by the Nurse Training Act of 1964,[8] cost $10 million in 1967.

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[5] P.L. 88–129, approved Sept. 24, 1963; 42 U.S.C. 294–294e.

[6] P.L. 89–751, sec. 8(b), approved Nov. 3, 1966; 42 U.S.C. 298c–298c–6.

[7] P.L. 84–911, approved Aug. 2, 1956; 70 Stat. 923.

Allied health professions training.—The Allied Health Professions Personnel Training Act of 1966[9] authorizes support for such baccalaureate and graduate allied health curriculums as medical technology, optometric technology, and dental hygiene, plus other allied health professions curriculums specified in regulations. The act also provides aid for training for such allied health occupations in junior colleges.

To be eligible for assistance, the accredited college or university must be affiliated with a teaching hospital and have at least 20 students enrolled in the specified training programs. The four major forms of aid provided are: (1) Construction grants for new or expanded schools; (2) basic and special improvement grants for teaching programs; (3) advanced traineeship grants to encourage the training of teachers, administrators, and specialists; and (4) grants for the development, demonstration, or evaluation of curriculums for the training of new types of health technologists.

Awards under the construction grant program will start in fiscal year 1968.

The improvement grant program began on a limited basis in fiscal year 1967, with $2.8 million available for grants in that year. This amount could provide for funding the basic improvement grants at only 40 percent of the formula ($5,000 per curriculum, plus $500 times the number of full-time students). No money was available for special improvement grants, since such grants are made after all basic improvement grants have been funded.

In the 1967 fiscal year, $750,000 was available for advanced traineeships authorized by the Allied Health Professions Personnel Training Act,[10] to help allied health professionals become teachers, administrators, and specialists.

In the same year, $200,000 was available for grants to develop, demonstrate, and evaluate curriculums for training new types of health personnel to meet the changing health needs of the Nation.

Aid for public health training.—Public Health Service aid for public health training dates back to the enactment of the Social Security Act of 1935, which authorized grants to the States to help them establish and maintain adequate public health services. A number of States did use, and many continue to use, a part of their funds under this program to pay for training of personnel for State and local public health work. Starting in 1956, to assure more adequate attention to unmet training needs, Congress authorized the Public Health Service to give various forms of direct aid for public health training.

The Health Amendments Act of 1956[11] established a program of traineeships for graduate or specialized training in public health for physicians, engineers, nurses, and other professional health personnel (sec. 306 of the Public Health Service Act). Designed originally to support long-term training, primarily of individuals newly entering the public health field or only recently employed in it, the program was extended in 1963 to include grants for short-term training to increase the competence of experienced professional health personnel. In fiscal year 1967, an estimated 1,350 individuals will have received long-term traineeships, and about 11,000 will have been supported for short-term training. The traineeship program also provides aid for public health residency training and short-term apprenticeships for medical and other professional students.

Formula grants to public or nonprofit accredited schools of public health have been in effect since 1958 to offset a portion of the difference between income from tuition and the cost of instruction of federally sponsored students (sec. 314(c)(2) of the Public Health Service Act). In fiscal year 1967, the Nation's 13 schools of public health received grants totaling about $3.75 million under this program.

Since 1960, project grants have been awarded to schools of public health, nursing, and engineering for projects to strengthen or expand graduate or specialized public health training (sec. 309 of the Public Health Service Act). The Graduate Public Health Training Amendments of 1964[12] extended the program to cover additional types of schools, among them medical and dental schools offering training in preventive medicine. In fiscal year 1967, about 145 grants totaling about $5 million were awarded.

National Institute of Mental Health

The primary objective of the National Institute of Mental Health's training program, established under the National Mental Health Act of 1946,[13] is to increase the number of specialists in the mental health field. Training is provided at all levels—professional and technical.

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[8] P.L. 88–581, approved Sept. 4, 1964; 42 U.S.C. 297.

[9] P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h.

[10] P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h–2.

[11] P.L. 84–911, approved Aug. 2, 1956; 70 Stat. 923.

[12] P.L. 88–497, approved Aug. 27, 1964; 42 U.S.C. 242g.

In fiscal year 1967, some 1,800 grants totaling $81.7 million (excluding research training) were made to support the training of physicians, clinical psychologists, social workers, nurses, aides, and others needed for the provision of service to the mentally ill. Stipends went to approximately 9,000 persons, not including research trainees.

Other Public Health Service

Although most of the training programs of other parts of the Public Health Service are limited to specialized or advanced training to help meet special health or disease-control needs, some provide basic occupational training. Examples are aid for training of cytotechnologists under the cancer control program and the support of training of radiologic technicians as part of the radiological health program.

Through the program of aid for regional medical programs under the Heart Disease, Cancer, and Stroke Amendments of 1965,[14] support will be provided for continuing education and other specialized training of health personnel, as part of a general program to improve the diagnosis and treatment of heart disease, cancer, stroke, and related diseases. Grants will be made to a national grid of about 50 regional groups or complexes. The activities of any individual program will depend on the plans developed by the applicant, which may be a university, a medical school, a research institution, or other public or nonprofit private agency or institution.

The recently enacted Comprehensive Health Planning and Public Health Services Amendments of 1966 [15] should stimulate a broader approach to health manpower problems in several ways. The legislation authorizes aid to States and communities for comprehensive health planning activities, including health manpower planning. It provides support for training health planners. It also revises the existing structure of grants to States and project grants to allow for greater flexibility in developing health programs and services, including the training of personnel.

Office of Education

The major contribution of the Office of Education to training health workers is under the permanent, ongoing program of aid for vocational and technical education. The Office also has an important role in administering aid for institutional training under the Manpower Development and Training Act and its amendments. Several of the Office of Education programs of aid for higher education provide some support for health occupations training.[16]

Aid for Vocational and Technical Education

The program of aid for vocational and technical education, administered mainly through grants to State boards of vocational education, supports any occupational training leading to gainful employment which requires less than a bachelor's degree and which is given under public supervision or control or under contract with a State board or local education agency. In 1966, an estimated 85,000 persons in the United States received training in health occupations under the program, at a Federal cost of about $6 million. About four-fifths of the students were in preparatory progams and the remainder received supplementary or refresher training.

The vocational education program became a major source of funds for training for health occupations following enactment of title II of the George-Barden Act of 1956.[17] This title provided aid for training in practical nursing and other health occupations. Thus far, practical nursing has led in numbers of persons trained. Other occupations receiving substantial support have been medical office assistants, medical laboratory assistants, and dental assistants. Training programs for such groups as operating room assistants, dental technicians, occupational and physical therapy assistants, and X-ray technicians also received support.

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[13] P.L. 79-487, approved July 3, 1946 (60 Stat. 421).

[14] P.L. 89-239, approved Oct. 6, 1965, 42 U.S.C. 299.

[15] P.L. 89-749, approved Nov. 3, 1966, 42 U.S.C. 246.

[16] Programs of aid for elementary and secondary education make a somewhat less direct contribution to health occupations training, although they do help to strengthen high schools and State departments of education generally.

[17] Act of Aug. 2, 1956, c. 871, 70 Stat. 925, 20 U.S.C. 15aa-jj.

The Vocational Educational Act of 1963[18] made more money available for vocational and technical education in all fields, and expanded the scope of activities that might be financed. It provided specific support for teacher education, curriculum development, instructional aids, supervision, and administration. It authorizes use of funds for construction, as well as for instructional costs. It has established a student work-study program. It extends eligibility for aid to technical programs in community and junior colleges, in addition to high school and postsecondary vocational and technical schools. It provides project grants for research and demonstrations in vocational and technical education.

Manpower Development and Training Act (Institutional Training)

The Office of Education has responsibility for approving project grants for, and conducting training in, institutional training programs (i.e., programs involving training in an educational institution at the vocational, technical, or junior college level) under the Manpower Development and Training Act of 1962[19] as amended. The Department of Labor's role in administering these programs, as well as in carrying full responsibility for administering MDTA on-the-job training projects, is discussed later in this chapter.

The MDTA program focuses on training and retraining of unemployed or underemployed youth and adults, and on upgrading the skills of workers facing displacement due to technological and economic changes. In addition to aiding teaching costs, the program provides allowances to trainees (paid directly by the Department of Labor). Training may be provided either through public education agencies or institutions or, as appropriate, through arrangements with private educational or training institutions.

The 1965 amendments[20] to the authorizing legislation made more people eligible for training allowances over longer periods, and emphasized and encouraged using private training institutions that provide training comparable in cost and effectiveness to the training available in public institutions.

From the start of the program in September 1962 through December 1966, about 56,000 trainees were approved for training in health occupations, at a cost of about $69 million; and about four-fifths of those approved were actually enrolled. The largest numbers of trainees were practical nurses and nursing aides or orderlies. Others trained included professional nurses (refresher courses), psychiatric aides, dental assistants, surgical technicians, medical laboratory assistants, and home health aides.

In the first 6 months of 1967, an additional 12,700 trainees have been approved. This increased rate of training has been particularly marked in the case of refresher courses for professional nurses.

Higher Education Programs

The main higher education programs providing aid for preparation for health occupations are the student aid programs, the college and university community service program, and the program for training teachers of the handicapped.

The Office of Education administers four major financial aid programs for college and university students: National defense student loans, under the National Defense Education Act[21]; guaranteed loans and educational opportunity grants, both under the Higher Education Act of 1965[22]; and college work-study aid, under the Economic Opportunity Act of 1964.[23] To the extent that they are not covered by special Federal loan and scholarship programs, students in the health professions are eligible for aid under these programs. Many students in the allied health fields have received such help.

The college and university community service program authorized by title I of the Higher Education Act of 1965[24] is designed to make colleges and universities better able to provide community service and continuing education programs. Under this program, a number of universities are developing activities to provide or upgrade training for professional or technical health personnel.

As part of its program of training teachers of the handicapped, the Office of Education provides aid for the training of selected allied health professions. In fiscal year 1965, for example, 99 institutions received training grants in speech and hearing therapy, and traineeships or fellowships were awarded to 608 individuals in this field. The total spent on this training was $1.7 million.

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[18] P.L. 88-210, approved Dec. 18, 1963; 20 U.S.C. 351.

[19] P.L. 87-415, approved March 15, 1962; 42 U.S.C. 2581-2602.

[20] P.L. 89-15, approved Apr. 26, 1965; 42 U.S.C. 2581 et seq.

[21] P.L. 85-864, approved Sept. 2, 1958, 20 U.S.C. 421-429.

[22] P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1061-1085.

[23] P.L. 88-452, approved Aug. 20, 1964; 42 U.S.C. 2751-2761.

[24] P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1001-1011.

Vocational Rehabilitation Administration

Under authority of the Vocational Rehabilitation Act[25] as amended, the Vocational Rehabilitation Administration,* since 1955, has supported the training of personnel who provide rehabilitation services to disabled persons.

Grants are made in the fields of medicine, nursing, occupational therapy, physical therapy, prosthetics and orthotics, psychology, public health, rehabilitation counseling, social work, speech pathology and audiology, recreation for the ill and disabled, sociology, and dentistry. In addition, grants are being made for support of specialized training for rehabilitation programs of interdisciplinary training, and for other specialized programs contributing to the vocational rehabilitation of disabled persons.

Support is provided for both long- and short-term training through grants to, or contracts with, educational institutions and agencies. Although most of the aid is for graduate or professional education, support has been made available also for baccalaureate, vocational, or technical education. Grants may be made for curriculum development or enrichment, and for program expansion, as well as for stipends for students.

In fiscal year 1966, there were 515 grants to institutions and agencies for long-term training, with the number of trainees totaling 4,500. Grants for short-term training numbered 175, for the training of 9,300 persons.

Since 1962, appropriations for research and training in vocational rehabilitation have included a designated amount for development of research and training centers, some 17 of which have been established to date. These centers provide a framework for continuing, comprehensive programs of research and training to advance the rehabilitation of the disabled. They offer both long- and short-term training.

The Vocational Rehabilitation Amendments of 1965[26] spelled out a number of the specific fields of training for which support could be provided. These amendments also increased the appropriation authorizations for vocational rehabilitation programs, including training aid, and the maximum period of time that an individual could receive traineeship support.

Welfare Administration

The Welfare Administration* provides aid for basic training of health personnel primarily through the work-experience program of the Bureau of Family Services. This program, authorized by title V of the Economic Opportunity Act,[27] pays the cost of experimental, pilot, or demonstration projects that help unemployed and other needy persons to become capable of self-support. Many projects have included training for such health service occupations as practical nurses, nursing aides, dental assistants, and hospital orderlies and attendants. An estimated 5,000 persons a year are being trained in these occupations.

The Children's Bureau of the Welfare Administration provides project grants for the training of professional personnel for maternal and child health care and for crippled children's services. In general, the training is for persons who have already completed basic professional education. Initiated under the 1960 amendments to the Social Security Act,[28] with additional authority included in the amendments of 1965,[29] the grants have supported the training of physicians, nurses, audiologists and speech pathologists, medical social workers, and other allied health professionals. In fiscal year 1965, training grants were awarded to some 50 institutions, and fellowships were given to some 240 individuals.

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[25] P.L. 89–333, approved Nov. 8, 1965; 29 U.S.C. 31 et seq.

[26] P.L. 89–333, approved Nov. 8, 1965; 29 U.S.C. 34.

*See note on p. 28.

[27] P.L. 88–452, approved Aug. 20, 1964; 42 U.S.C. 2922 et seq.

[28] P.L. 86–778, approved Sept. 13, 1960; 42 U.S.C. 716.

[29] P.L. 89–97, approved July 30, 1965; 42 U.S.C. 716.

Department of Labor

MDTA On-the-Job Training

Under the Manpower Development and Training Act of 1962 [30] as amended, the Department of Labor provides financial assistance to employers and institutions for on-the-job training of workers for unfilled jobs. Although the program covers any segment of industry, more than 600 contracts have been made with hospitals, nursing and old age homes, dental laboratories, and rehabilitation centers, for training in nearly 40 health-care occupations. Since the program began in 1963, more than 30,000 persons have been trained or are in training, at an average cost per trainee to the Federal Government of $297.

MDTA Institutional Training

Although the Office of Education approves the content of MDTA institutional training projects (see OE section of this chapter), the Department of Labor determines training needs in cooperation with State employment agencies. It also selects, counsels, refers, tests, and places trainees, and pays the training allowances to those trainees who are eligible for such support.

MDTA Experimental and Demonstration Projects

Experimental and demonstration projects under the Manpower Development and Training Act are administered directly by the Labor Department. Designed to seek new ways to meet manpower problems, these projects have been directed principally to the disadvantaged individual unable to gain steady employment.

In the field of training, new techniques have been sought for providing needed basic education, work orientation, and other prevocational remedial services, and new job instruction methods and settings have also been tried. An example of a project involving health occupations training is the Howard University project to train disadvantaged persons as new types of aides in health, education, and welfare fields.

The 1965 amendments to the Manpower Development and Training Act [31] gave a mandate for expanding experimental and demonstration projects, without regard to matching requirements or apportionment of funds among the States.

Neighborhood Youth Corps

The Labor Department also administers the Neighborhood Youth Corps program established under the Economic Opportunity Act of 1964.[32] This work-training program provides part-time work for youths 16 to 21 who would otherwise be unable to stay in or return to school, and work experience for up to 32 hours a week for youths who have left school permanently and who lack skills needed in today's economy. Funds may go to a State, county, city, or private nonprofit organization, to pay up to 90 percent of costs. Among the groups trained under this program have been nursing aides, hospital orderlies, and other types of health personnel.

Office of Economic Opportunity

Community Action Program

The Community Action Program of the Office of Economic Opportunity, under the Economic Opportunity Act of 1964, [33] has supported training of health personnel. For example, a pilot program administered in cooperation with the Public Health Service aims at recruiting and training the poor, age 45 and over, as home health aides. In the initial phase of this project, 3,000 were trained, in conformity with standards for home health services under "medicare."

Neighborhood Health Centers

The Neighborhood Health Centers are comprehensive ambulatory care facilities providing the entire range of diagnostic and treatment needs for target area populations. Part of the neighborhood health center concept is the involvement of local residents as employees in the health center. Therefore, projects either provide for or arrange for training of neighborhood residents for employment in the center and/or other health related institutions and agencies.

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[30] P.L. 87–415, approved March 15, 1962; 42 U.S.C. 2581–2602.

[31] P.L. 89-15, approved Apr. 26, 1965; 42 U.S.C. 2572.

[32] P.L. 88–452, approved Aug. 20, 1964; 42 U.S.C. 2731–2736.

[33] P.L. 88–452, approved Aug. 20, 1964; 42 U.S.C. 2781 et seq.

VISTA

The Office of Economic Opportunity VISTA program furnishes local public and private agencies engaged in the War on Poverty with "Volunteers in Service to America," who live and work among the poor for at least 1 year. There are no minimum education and experience requirements. An intensive 6-week training course prepares each volunteer for the job and for the location of the project in which he will serve. Jobs have included those in hospitals and in other health programs, such as work with the mentally ill and retarded.

Job Corps

The Job Corps program of the Office of Economic Opportunity is a residential program of vocational training, remedial education, and work experience, designed to equip youth from impoverished homes with the skills and attitudes needed to find and hold suitable employment. Of the several types of centers operated, those with the greatest potential for training health personnel appear to be those for women located in or near metropolitan areas.

Chapter V

Look to the Future

Studies of health manpower made over the years have shown repeatedly that, despite the increasing supply, demands for health services continue to outstrip the resources for producing them. Supply and demand, according to present evidence, will not soon be in balance. The task ahead is not only to increase the supply of well-qualified health workers. It is equally urgent to make the best use of the resources which are available.

This chapter points out opportunities for study, experimentation, and action in these directions. Their manifold purpose is (1) to increase the health manpower supply; (2) to improve education and training; (3) to use health manpower more effectively; (4) to make pay, working conditions, and career opportunities more attractive to health workers; and (5) to provide a sound basis for more effective and better coordinated planning, and for formulating policies.

Underlying all the discussion is the expectation that continuing study and experimentation will help all manpower programs to respond to the needs of society, even though the needs may change rapidly.

Increasing the Health Manpower Supply

Adding to School Capacity

The foregoing chapter has shown the extent to which Federal funds are available for construction of facilities and for support of educational programs for health-related occupations. Funds from State and other public and private sources have substantially increased financial support of many public and private institutions. Together, these funds are resulting in increases in the capacity of schools to educate people for the health occupations.

However, much more can be done to increase the capacity of existing facilities. For example, a number of colleges and universities have changed from a two-semester year to a three-semester year so that facilities have greater use, and school capacities are substantially increased. Experiments of this kind should be encouraged and supported.

Better use of existing facilities, and of faculty as well, may result from the use of advanced placement examinations, to avoid the necessity of using scarce facilities to house students repeating work already mastered but for which they have not received appropriate academic credit.

Attracting Recruits to the Health Field

Educational programs to prepare people for the health occupations depend on attracting able young people to careers in health. The Surgeon General's Consultant Group on Nursing recognized recruitment as a major national problem and recommended that the Public Health Service assist with vigorous recruitment efforts (*1*). Such assistance was also recommended by the National Advisory Health Council in its report to the Surgeon General in 1961 (*2*).

Young people should be made aware of the opportunities in the field of health early in their school experience, as well as when they complete high school and junior or senior college. The opportunities to recruit older people are also substantial, as shown by the increasing number of older women returning to the labor market.

The health services have a natural appeal for many individuals who are concerned for others, who have aptitudes in certain technical fields, and others. Success in recruiting, however, will depend on more than intensity of effort and good timing. It must be related to the availability of places in educational institutions, employment opportunity, and the interests and capabilities of the individual.

Young people who can succeed in college should be directed to collegiate programs. Discriminatory practices must be ended. Financial assistance must be available to qualified students in the form of loans, scholarships, fellowships, and stipends when needed. Recruiting efforts may anticipate greater success when opportunities for career development are better and when pay and working conditions are improved.

Approaches such as local career days or weeks, junior and senior high school guidance counseling, and youth organizations are being strengthened. Newer approaches, such as health fairs, are being developed.

The Nebraska Centennial Health Fair in Lincoln was attended by nearly 100,000 high school and junior college students. Exhibits and computer-programed career information were among the features of this fair.

Workshops to promote the development of State health career councils have, in turn, developed mechanisms at State and local levels for motivating young people to enter the health professions. Thirty-two councils, representing States and metropolitan areas, are now pursuing active programs.

The Virginia Council on Health and Medical Care and the Virginia Hospital Association have named liaison officers from over 75 hospitals in the State to aid in recruiting and to give opportunities for young people to see what is being done in hospitals in their fields of interest and to talk with persons working in those fields.

There is considerable evidence that adequate and accurate information is not reaching enough of the potential recruits. Guidance counselors and school officials are often unaware of the many opportunities for students. There is great need for closer links between the health system and the public educational system. Particularly serious is the general lack of public understanding of many of the health professions, and their requirements for higher-than-average students and for many more collegebound students. Counselors should be well enough informed to direct applicants into educational programs appropriate for their interests and abilities.

Recruitment has been considered primarily the responsibility of the professions and of voluntary agencies and community groups. However, it is clear that the efforts of these groups need stimulation, coordination, and substantial financial support.

Traditional limitations related to sex also affect the attraction of health careers. In the United States less than 10 percent of the entrants to medical school are women, while in Western Europe 20 to 30 percent of the medical students are women (*3*). In Eastern Europe the proportions are even higher. In nursing, at the other extreme, only 2 percent of the students are men. In these, as in other fields, opportunities for the outnumbered sex are increasing, and are increasingly appreciated. But much remains to be done.

Lack of opportunity for Negroes in the health professions reflects not only a widespread educational disadvantage, but also limited opportunity for professional preparation and employment. Only 2.6 percent of medical students, 2.9 percent of students of nursing, and 17 percent of those in practical nurse programs are Negro (*4, 5*).

Return of Inactive Health Personnel to Practice

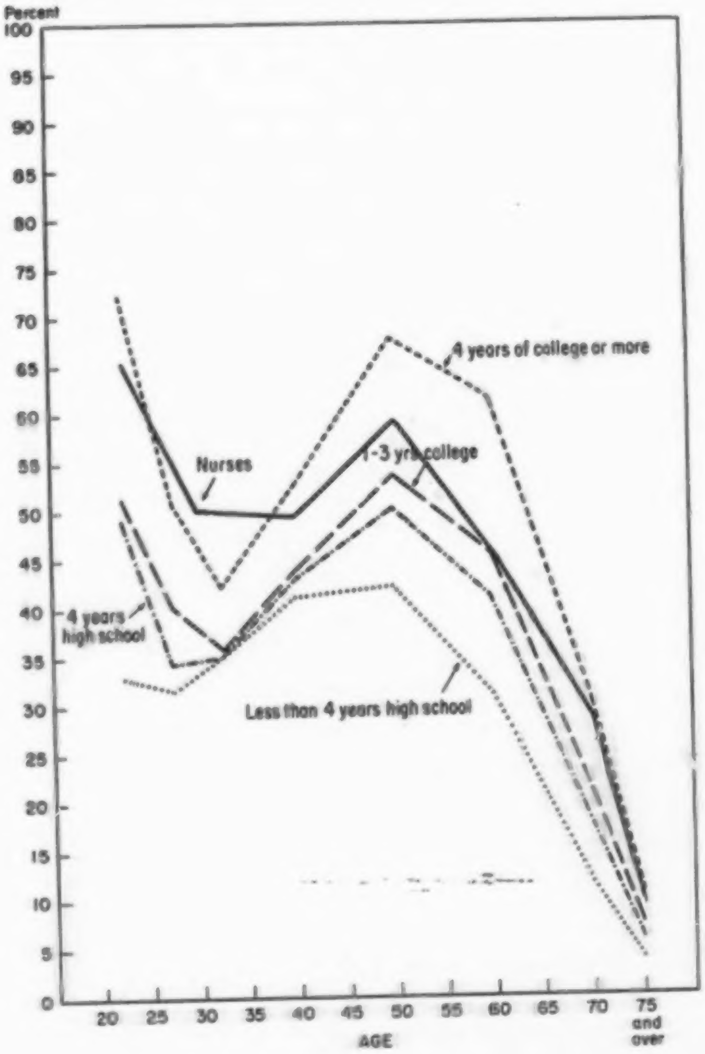
Of the women who enter the labor force upon completion of their education, a considerable number leave when they marry or, more typically today, during the early period of child raising. Many of these women reenter the work force in their thirties and forties and remain to a normal retirement age. In recent years, the proportion of women in the labor force has risen steadily. About a third of all 30-year-old women are in the labor force, and about half of those who are 50 years old.

In general, women with higher levels of education stay in the labor force longer, and are more apt to return to the labor force, than those with less education. Studies of nurses show that their working life pattern is much the same as that of women with some college education (fig. 8), though they tend to retire at a slower rate.

Of the 1,200,000 nurses in 1966, almost half were not in practice. About 310,000 of these were maintaining their professional registration, and an estimated 20,000 nurses reenter the work force each year. Parallel information is not available on women in other health occupations, but some evidence and logic suggest that their working life patterns are much the same as those of nurses.

Many women health workers who reenter the labor market without refresher courses would function more effectively with such help. Many who have not returned have indicated that new knowledge and recent

Figure 8. Proportion of registered nurses employed in nursing compared to proportion of women of different educational levels in the labor force: 1960.



changes in practice and technology make refresher courses essential before they can return to work.

The Public Health Service is cooperating with the Office of Education, the Department of Labor, and the American Nurses' Association in working with the States to identify and recruit inactive nurses; locate opportunities for their employment; and to stimulate the provision of retraining programs in the areas where inactive nurses live and unfilled positions exist. Programs to attract inactive women health workers will be more effective as health personnel employers improve their employment practices. Important incentives to facilitate the return of married women to employment would be more flexible working hours, higher wages, part-time positions, arrangements for care of children, and for some, special housing facilities.

Innovations in Education and Training

Experimentation in Teaching Programs

Education for health service, professional and technical alike, needs the kind of critical review and experimentation given to education in mathematics and the physical sciences in the past decade. The cost will be high. In science it has been possible with substantial Federal aid. Similar large-scale help is urgently needed in health fields.

Experimentation characterizes the health services provided today by many institutions and individuals, but innovations will not find their way into practice until they are tested by educational institutions and incorporated into curriculums.

Teachers for newly developing health occupations, as well as for those which now exist, are in critically short supply and many are inadequately equipped to teach new techniques. Teachers are needed at every level—for volunteer rescue squads and short-term inservice trainees, and for the most highly skilled specialties. Inadequacies in teacher training are inevitably reflected in the quality of health care.

Identification of Service Needs

The health needs of the Nation demand that education and training be made more responsive to them (*6*).

How many workers are needed, and for which occupations? How are students of the health professions to be prepared for rapid social and technological change? Of the many ways of organizing medical practice and the delivery of health services, which seem most promising in what circumstances?

Much is said today about the need for a personal physician, a "family doctor," to advise the patient and to bring together the many resources needed in personal medical care. While the role of family doctor can be filled by a physician in any specialty, it has been filled primarily by general practitioners, more recently joined by internists and pediatricians, particularly for middle and upper income groups. The number of physicians in these three groups has declined sharply in relation to population as the complexity of medical knowledge and technology has increased. There is little evidence that the need of patients to have a physician direct their care has evoked an appropriate educational response.

Only by identifying the real needs of patients for services and examining the array of alternatives for meeting them can education for the health occupations properly respond.

Career Development

The health professions and educational institutions must develop ways for competent persons to move from one level of health work to another or from one occupation to another. Health workers should be able to advance in their work opportunities in accordance with their capability and performance. However, many workers are prepared in programs which do not permit such advancement. They cannot move upward or to another field, building on their experience, but must return to school and prepare for the new or the advanced field from the beginning.

This type of problem can be found in many occupational fields. For example, those young people who enter nursing through a diploma rather than a degree program have limited opportunity for advancement. There are beginnings of experimentation with curriculum continuums and with the development of courses to bridge the gaps between the various educational programs.

At a time when job content and educational patterns are both changing rapidly, there is urgent need for mechanisms to encourage and promote career development opportunities and paths for the health occupations.

Equivalency Examinations and Advanced Placement

Changing educational concepts and environments call for methods to determine whether knowledge acquired nonacademically is equivalent to that learned in a formal academic program. The need for equivalency examinations for the health occupations, as for others, is based on the premises that (1) students should not be required to repeat work which they have already mastered, (2) the objectives of college course work can be achieved in other than classroom situations, (3) acquisition of knowledge and skills can be measured by examination, and (4) the results of these examinations can be used by colleges to determine whether advanced placement or academic credit should be awarded for the previous learning and experience.

The advanced placement program for superior high school students is one widely accepted program based on achievement outside the college environment. This program, administered for the colleges by the College Entrance Examination Board and the Educational Testing Service, offers examinations prepared by a committee of college teachers, secondary school teachers, and testing specialists. The colleges accept the results of the examinations as a basis for judging whether or not students should be granted advanced standing and/or college credit for work not done in college (*7*).

Another program based on equivalency examinations is the College Proficiency Examination Program of the University of the State of New York, which is open to individuals doing college level work in a noncollege setting. The State department of education accepts the results of the examinations to meet some of the requirements for teacher certification and other professional licensing. Individual colleges determine whether credit should be awarded (*8*).

Equivalency examinations have far-reaching implications for the health occupations and for unlocking dead-end careers and establishing new career ladders. Some pilot studies have been conducted in nursing education, and programs have been developed to bridge the educational gaps between the 3-year diploma schools and the baccalaureate programs.

Continuing Education

Opportunity for continuing education should be available to all types of health workers—the physician, dentist, nurse, medical technologist, practical nurse, and aide, among others. That this need is becoming more recognized is shown by a growing literature,[1] and by discussions at professional meetings, at hospital conferences, and in educational groups.

The American Medical Association has long been involved in continuing education. It has played a valuable role in publishing the *Journal of the American Medical Association* and a number of specialty journals. In addition, the American Medical Association Council on Medical Education has recently established a committee to accredit programs in continuing medical education.

The development of regional medical programs under the Heart Disease, Cancer, and Stroke Amendments of 1965 (P.L. 89–239) offers significant possibilities for continuing education in the field of health. These programs are intended to provide patients the latest advances in diagnosis and treatment of heart disease, cancer, stroke, and related diseases through cooperative arrangements among health agencies and their staffs.

Continuing education has been hampered by lack of definition of purpose, limitations of teachers, and lack of professional interest. The emergence of directors of medical education in community hospitals is encouraging. Medical schools are showing more interest and activity; some are establishing departments of postgraduate or continuing education. Professional associations are stressing, and providing opportunities for, continuing physician education. The extramural program of the National Library of Medicine, including the expansion of the MEDLARS (Medical Literature Analysis and Retrieval System) system and further development of the library function to include the learning center concept, provides additional opportunities for physicians to continue to educate themselves.

Health Manpower Utilization

Nothing is more important than using the existing supply of health manpower—professional, technical, and auxiliary—most effectively. The first step is to examine carefully how our limited supply of health personnel functions at present. The problem must be viewed as a national one and the approach must be systematic, based on sound knowledge of the operations, with the needs of the patient identified and kept paramount.

Planning for the use of health personnel must be quickly responsive to changing knowledge and social changes and the increasing expectation of health service consumers.

Exploration of Health Service Functions

As a first step, we should, by analysis and experiment, identify those functions which must be performed by the professional and those which can be performed satisfactorily by the technician or auxiliary worker under appropriate supervision.

The highly skilled physician, with more than a decade of education following high school, should use his time doing those tasks which he alone is prepared to do insofar as this is consistent with the needs of the patient. Otherwise, he is practicing inefficiently and may lose his highest professional skills and the stimulus to continue his education.

The requirement for best use of professional skill has been neglected in most of the few studies of the functions and the quality of care which physicians provide. Most studies have started from organizational patterns of institutions in which physicians serve, and from job descriptions which emphasize a physician's preparation. Few have been designed to look at patients and their needs, the actual functions of the people who serve these needs, and the ways in which the services are provided. The experiences of industry and business can be of great help in such studies by adapting their methods for evaluating consumer needs and habits to observation of the patient and his care. These methods are applicable to any setting in which patient care is given.

Studies of the quality of care which patients receive, although difficult, are of great importance. A widely quoted study of general practice in North Carolina represents a worthwhile effort (*10*). The University of Pittsburgh School of Public Health, at the request of the New York Society of Internal Medicine, has studied the practice of internists in New York State (*11*) and analyzed such factors as background of physicians, form of practice, patient load, and professional activities of physicians other than care of private patients. Dentistry and nursing have made basic studies of the functions of professional and nonprofessional personnel and time-and-motion studies of these functions in various settings. A number of dental studies have focused on the use of assistants, and continuing study and experimentation are supported by the Division of Dental Health of the Bureau of Health Manpower.

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[1] The Dryer report, issued in 1962, proposed a nationwide "university without walls" to provide for continuing education of the Nation's physicians (9).

In the nursing field, work measurement studies and analyses of activities have been used to reassign nursing functions to aides and other personnel. Experimentation with different nurse staffing patterns is being conducted by the Division of Nursing of the Public Health Service and others. Experimentation should be extended to other aspects of education and service in the health fields.

Good personnel utilization is hindered in some States by outmoded limitations (incorporated into licensure and certification codes) on the functions of professional or technical personnel. Some of these have exceeded their original purpose of ensuring high quality of patient services and have become roadblocks to the effective utilization of health manpower.

The goal for manpower utilization should be to have each worker on the health team performing consistently at his highest level, with coordination of the efforts of all team members and the optimum use of all facilities. This requires more precise definitions of functions and the development of new types of health workers, as well as sound planning, organization, and management.

Development of New Types of Health Workers

Health technicians, auxiliary health workers, and administrative personnel have been used to increase substantially the productivity of the physician, dentist, nurse, and other health professionals. In 1900, for every 10 physicians there were six other health personnel. By 1960, for every 10 physicians there were 100 other health workers, exclusive of administrative personnel and other assistants not trained in health occupations.

Many duties and responsibilities once considered strictly the province of the physician, dentist, or other professional health worker can be performed equally well by a person of lesser training. Those who assist the physician cannot be classified in any single job description. Individuals must be trained in different ways to fit different roles, learning new skills as medical knowledge and technology change. For some, training will be fairly short. For others, a college degree plus 1 or 2 years of special training after college will be required. Avenues to further education should be kept open for such workers.

Our constantly advancing health technology is continually creating new kinds of allied health personnel. The inhalation therapy technician, the prosthetic technician, and the cytotechnologist were unknown 20 years ago. New and experimental training programs are underway in these and many other fields.

One new category of health workers which has received inadequate attention is medical administration—yet the need for such personnel is rapidly increasing in hospitals, in group practice, and in other health service areas.

Other new types of health workers include medical emergency technicians, home health aides, assistants to physicians (comparable to the medical corpsman of the Armed Forces), and "pediatric public health nurse practitioners" to assume an expanded role in child health. These function particularly well in group or hospital settings.

Continuing experimentation is needed to show to what extent additional assistants, specially trained, can be effectively utilized.

In the field of dentistry, we should be able to delineate expanded roles for new types of dental assistants, based upon continuing analysis of how technological advances affect dental functions. Considerable numbers of dental assistants with broader roles must be trained and utilized.

Experiments in the training and use of dental auxiliaries with expanded functions have been conducted by the Public Health Service. In evaluating the work performed by auxiliary workers among Indians, no significant difference was found in the quality of fillings placed by the dentist or by the auxiliary in cavities first prepared by the dentist (*12*). Dental nurses with expanded functions, including filling teeth, have long worked effectively in the school dental health program of New Zealand. Experiments and studies on the use of trained chairside assistants and their functions also are underway.

Closely related to the need for new types of health workers is the need for improved working relationships among existing groups. If the needs of patients are to be properly met, all those involved in a patient's care must function as a well-knit team. Distinctions and discriminations among professionals, and those between professionals and technicians, hamper constructive work relationships. The preparation for such working relationships must begin in the preparatory educational program.

Organizing the Delivery of Health Services

Health services should be organized to make the most effective use of all personnel, from the professional to the volunteer.

Many rationally organized units make excellent use of available health manpower and provide coordinated services. These take various forms because of the great variations in the individual needs of people, in customs, in the availability of resources, and in the many other factors which influence all functions of our highly diverse society. Among these examples can be cited many types of group practice, hospital-based and other home care programs, hospital-related extended care facilities, regional hospital plans, expanded outpatient and emergency care, rehabilitation programs, and new systems of day or night hospital care—for example, for mental patients.

These organizational mechanisms should be extended, but they need continuing study and experimentation, along with evaluation of personnel utilization, benefits to patients, program costs, and other factors. All such studies and experiments must be measured against the quality of care given to patients.

Continuum of Care

When individual preventive, diagnostic, therapeutic, and rehabilitative services are disorganized and uncoordinated, health manpower time, effort, and skills are underutilized.

Preventive services as well as curative and rehabilitative services require good organization. All people should have access to a full range of preventive measures to provide a healthy environment, to minimize accidents, and to give protection against diseases for which specific methods of immunization are available. Appropriately trained personnel and organizations to provide such preventive services are essential.

Care may be fragmented also if facilities are restricted to special population groups when there is no sound scientific basis for such restriction—whether by disease category (mental and tuberculosis hospitals) or by economic status of patients (city and county hospitals). Optimum use of resources is prevented, with resulting less efficient use of personnel. Furthermore, such restrictions are usually not sound public policy.

Group Medical Practice

Group practice brings together medical generalists and specialists who share facilities and the services of supporting professional, technical, and administrative personnel. Group practice is a logical development to offset fragmentation, to improve efficiency, to maintain quality, to give more constant and dependable coverage, and to provide opportunities for professional development. Despite its many advantages and its effective use of health manpower, it has not grown as rapidly as its potential usefulness would indicate.

A survey of medical groups, conducted in 1959 by the Public Health Service, found more than 1,600 such groups in the United States (*13*). The number of multispecialty medical groups increased more than threefold between 1946 and 1959; by 1962, this form of practice had enlisted one-eighth of all physicians in private practice (*14*).

Preliminary information from a study (to be published in 1967) of group practice, conducted by the American Medical Association, showed some 5,500 formally organized groups of three or more physicians, with approximately 26,000 members, representing about 14 percent of private practitioners (*15*).

A recent Canadian report on group practice clearly points out the financial and professional advantages from personnel sharing (*16*).

The formation of groups by full-time medical school faculty members is a relatively recent but important development. Since World War II, full-time clinical faculty members in the Nation's medical schools have increased substantially. In many schools, the pattern of informal group practice, in terms of patient care and referrals, has come to include organized plans in which fees from private patients are pooled.

There is need for technical assistance to physicians, to consumer groups, and to communities interested in forming group practice units. Those few voluntary associations familiar with the problems facing new groups report more demand for consultation and advice than they can meet (*17*).

Reducing Demands for Hospital Care

Not every patient who is in a hospital belongs there for medical reasons. According to the recent report of the Governor's Committee on Hospital Costs for New York State, "at least 10 percent—more likely some 14 to 17 percent—of the patients in general hospitals do not need to be there" (*18*). Some could be treated adequately on an ambulatory basis. Others would have a shorter hospital stay if more complete diagnostic work had been done prior to admission. Still others would be discharged earlier if adequate arrangements could readily be made for convalescent care at home or in nursing homes, if such facilities were available.

Hospital-based home care programs have been successful not only in freeing hospital beds for acutely ill patients, but also in caring for patients in the more satisfying environment of their homes.

For home care programs, a variety of professional, technical, and auxiliary health personnel is required. We know too little about the relative efficiency of personnel utilization in hospital and in home care programs to be dogmatic about the savings in many kinds of situations.

Greater use of extended care facilities can ease the case load in general hospitals. Hospitals which have, or are affiliated with, extended care facilities can arrange patient transfers more easily, facilitating the flow of patients, reserving the hospital bed for the acutely ill patient, and making better use of both staff and facilities. How these alternative programs affect manpower utilization should be analyzed and evaluated.

Regionalization

Among the most promising means of alleviating personnel shortages in rural and other areas are regional health planning and organization. Under the regional concept, every area without ready access to good diagnosis, treatment, and care—whether the lack be hospitals, physicians, or nursing services—would be critically examined, its needs defined, and suitable patterns of service developed. Manpower use must be related both to community needs and to the nearest existing network of health facilities and equipment.

One basic tenet of the Hill-Burton Act was that the construction of hospitals and health centers would attract health manpower, especially physicians, to rural areas. To a certain extent this has been the case, though more noticeable in the redistribution of nurses than of physicans. To extend this concept, those organizational patterns that will further encourage better distribution of personnel should be developed. Comprehensive regional health operations and more group practice units, with satellite offices in neighborhoods and rural areas, should receive more experimentation and support.

Related to distributional problems is the question of State licensure and reciprocity arrangements. Full reciprocity across State lines would greatly facilitate the movement of certain types of health professionals from areas of relative abundance to areas of greater need. Until such reciprocity is a reality, the successful completion of a refresher course in a recognized institution should be sufficient to obtain licensure or certification in any State.

Other Organizational Techniques

Additional coordinating mechanisms should be further developed to facilitate the flow of patients in relation to their needs and to make optimum use of personnel in health facilities and programs. These include hospital utilization review committees, interhospital bed registries, community referral and placement services, and areawide planning, not only for construction and use of facilities, but also for recruitment and training programs and for placement of personnel.

Guidelines for Staffing Health Services

Missing in planning to improve manpower utilization are guidelines for staffing community health services and facilities. Such standards are difficult to establish, even in broad terms. Of necessity, they may vary widely among different sections of the country, and most certainly they are subject to constant change. They depend not only upon people's health needs, but also upon advancing technology, increasing health personnel productivity, and improving the way services and facilities are organized.

Some progress in measuring patient needs and experimenting with staffing combinations has been made in the fields of nursing and dentistry. For licensure purposes, some States have formulated minimum staffing standards for health facilities. "Conditions of participation" have been drawn up for the medicare program.

It is both necessary and desirable to evolve minimum and flexible guidelines for staffing patterns to assure good patient care in hospitals and extended care facilities, and to develop personnel requirements for ambulatory and home-care coverage, taking into account the local availability of different categories of workers.

Automation and Other Technological Advances

An improved surgical procedure which uses new knowledge and techniques usually requires more, not less, personnel, and such personnel must be more highly trained and specialized. Automation of laboratories may reduce the number of workers needed, but will require a more knowledgeable and more highly trained staff.

Many examples show the usefulness and economies to be derived from automating certain procedures in hospitals, laboratories, and clinics. For example:

1. The autoanalyzer in the clinical laboratory can perform in an 8-hour day the equivalent of what an average technician would be expected to do in 3 weeks (*19*).

2. The Permanente Group Health Plan gives periodic health examinations to more than 4,000 patients monthly in automated multitest laboratories. A computer processes all the data from the tests and prints a summary report for the information of the physician when he examines the patient. Automated equipment not only permits many more tests for the same cost and at greater speed, but also provides laboratory information to the doctor at a considerable saving of his time (*20*).

3. A recently opened 710-bed Veterans' Administration hospital in Washington, D.C., is perhaps the country's most fully automated hospital. Among its mechanized systems are an automated tote system for distributing supplies, a graphic control panel which monitors and controls all mechanized systems of the hospital, and an automated data system which will eventually automate much information on patient care, starting with the physician's orders (*21*).

To justify the costs of automation, the volume of health services must be substantial. Even so, the potentials of automation should be explored, not only by large single hospitals, but also by groups of hospitals in a community, area, or region, and by hospital linkages with clinics and extended care facilities. For instance, a centralized automated laboratory for all community health institutions may provide better and faster service than three or four small separate laboratories.

While automated equipment may result in substantial savings of time for some skilled personnel in the hospital, it does not necessarily produce dollar economies. Automation gives a faster, more nearly accurate result, but frequently the number of services requested is increased. For some institutions, the potential gain may be offset by the need for more highly skilled and more expensive supervisory personnel. However, the health industry should study and evaluate these modern techniques and be imaginative in applying those of real value.

Increasing Pay and Improving Working Conditions

Certain levels of the health services industry, by tradition charitably based and largely dominated by women, have offered relatively few incentives for a rewarding career. In the past, many hospitals (such as tuberculosis and mental institutions) were isolated, detached from the mainstream of community life. Poor wages and working conditions, along with lack of opportunity for lateral and upward mobility, created a high rate of turnover.

Nurses' salaries have been notoriously low in relation to the salaries of comparable professional and technical workers. General duty nurses in nongovernmental hospitals—the largest group of nurses—averaged $4,500 a year in 1963, according to the Bureau of Labor Statistics (*22*). Teachers averaged $6,235; secretaries, $5,170; and female factory workers, $5,075.

Many health service workers earn wages considerably below the poverty level. In 1963, 43 percent of nursing aides and 11 percent of licensed practical nurses in nongovernmental hospitals were paid less than $1.25 an hour. Of all nonsupervisory employees in hospitals and related institutions, an estimated 237,000 (16 percent) were paid less than $1.00 an hour (*22*).

The scarcity of highly skilled health workers and pressures from worker organizations are forcing hospitals to pay higher wages. Over the past 2 or 3 years there has been a general improvement in wages. And under the concept of reasonable reimbursement of hospital costs in title XVIII (Medicare) of the Social Security Act, there is a clear incentive to better pay.

Under the Fair Labor Standards Amendments of 1966, employees of all non-Federal hospitals and nursing homes are entitled, for the first time, to receive minimum wages and overtime protection. As newly covered groups, however, the minimum wages for these employees are lower ($1.00 in 1967; rising to $1.60 in

1972) than those recommended for employee groups already covered.

Nonprofit hospitals and State and local governmental hospitals are specifically excluded from coverage under the National Labor Relations Act, which helps employees to bargain collectively for better pay and working conditions; and the National Labor Relations Board has chosen not to assert jurisdiction over nursing homes or proprietary hospitals. Suits have been brought challenging this NLRB decision. Regardless of the decision on this issue, of course, the statutory exclusion of nonprofit, State, and local hospital employees would remain.

With higher wages, improved working conditions, and better prepared staff, the total cost of health care can be expected to continue to rise.

The cost of improved working conditions and increased pay for lower level health personnel would be offset, at least in part, by increased staff efficiency. Present low pay rates tend not only to encourage high turnover rates, but also to attract incompetent personnel, both of which add to the costs of providing minimally adequate care.

Turnover among hospital personnel has not recently been analyzed on a national basis. In 1956, the average annual rate was about 60 percent, according to the Public Health Service and the American Hospital Association. The turnover, they estimated, added nearly $100 million to hospital running costs (*23*). In 1958, an 83 percent annual turnover rate was reported by the Catholic Hospital Association.

The Bureau of Health Manpower in the Public Health Service

To provide the Department of Health, Education, and Welfare with a focus for administering and programing health manpower activities, a Bureau of Health Manpower was established within the Public Health Service in 1967.

The new Bureau's major concerns are with education for the health services and investigation to identify the specifics of health manpower problems. It aims to provide the information required to deal with them. Its responsibilities, broadly speaking, are to assess current and future needs for health manpower and the requirements and resources for meeting them, and to formulate programs to meet those needs.

In carrying out these tasks, the Bureau supports and encourages the development of educational programs, stimulates better utilization of health manpower, encourages innovations, and explores the need for new types of health workers.

The Bureau provides leadership in dealing with health manpower problems. It administers the Health Professions Educational Assistance Act, the Nurse Training Act, and the Allied Health Professions Personnel Training Act. It also provides aid for training of public health personnel.

The Division of Physician Manpower is concerned with increasing the supply of physicians and improving their preparation and utilization. It supports continuing education programs for physicians. It assesses national needs and trends in physician supply, demand, and utilization.

The Division of Dental Health is concerned with increasing the number of dentists and auxiliary dental workers and improving ways of using them. It promotes measures for preventing and controlling dental diseases. It encourages applied research and cooperative studies in foreign countries. It supports dental care in the Head Start program of the Office of Economic Opportunity.

The Division of Nursing is concerned with increasing and improving nursing services. It conducts studies and programs to that end, offers consultative services to public and private organizations and institutions concerned with nursing, and administers extramural research programs. It also administers grants to schools of nursing for construction, for improving education, and for financial aid to students.

The Division of Allied Health Manpower is concerned with increasing the number of qualified allied health workers, improving their distribution, enhancing training opportunities, and developing new and improved training methods and techniques. The Division administers traineeship grants, project grants, educational improvement grants, and new method grants.

The Division of Health Manpower Educational Services administers grant and loan programs for education and training in the health occupations. It provides consultative services in the techniques of handling grants and loans for health manpower programs to educational institutions receiving such funds.

A National Advisory Health Manpower Council was established in the spring of 1967 to provide advice and consultation to the Surgeon General of the Public Health Service on health manpower activities. The Council is composed of persons representing a broad range of interests, including both the health professions and those outside the health field. The Council will review the major problems concerning health manpower and will advise the Surgeon General on policies and programs designed to marshall the resources needed to cope with these problems.

Program Planning and Development

Areawide planning for health services must relate health manpower needs to plans for facilities, organization, and program goals. To this end, statistical baselines must be established for essential data on manpower. This information must be collected and published regularly, and utilized for planning purposes.

Data on supply, needs, and resources should be assembled, analyzed, and acted upon, both nationally and locally. In the States, this function should be an essential component of the health planning inaugurated under the new Comprehensive Health Planning and Public Health Services Amendments of 1966 (P.L. 89–749). Many of the needed data are already available; others are collected now by voluntary and public agencies.

Under this legislation the Surgeon General is authorized to make grants for comprehensive State health planning to States which have submitted State plans. Among other requirements of the law, a State agency is designated to administer the planning functions, and a State health planning council is established. These councils include representatives of State and local government agencies, of nongovernmental organizations and groups concerned with health, and of consumers of health services. The State agency may be either an existing one or a new planning agency; it may be the State public health agency.

This program provides new opportunity to the health professions to participate in State and regional planning. It should be a substantial stimulus to broad-visioned review of total health manpower needs and of the resources which can be mobilized to meet them.

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Appendix A

Federal Aid Available for Education and Training of Health Service Personnel

[See p. 62 for exclusions and footnotes]

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE **PUBLIC HEALTH SERVICE** **Health professions educational assistance:**				
Grants for construction of new, expanded, or improved teaching facilities (Health Professions Educational Assistance Act of 1963, as amended in 1965 and 1966) (P.L. 88–129, approved Sept. 24 1963; 42 U.S.C. 293–293h).	BP..........	Grants for up to 66⅔ percent of costs of construction of new schools or major expansion of existing schools; 50 percent of costs of minor expansion, renovation, or replacement (veterinary medicine added in 1966).	Grants through Mar. 1, 1967 will provide for a total of 3,324 new 1st-year places in schools of medicine, dentistry, public health, pharmacy, and optometry.	$135.0 (1967 appropriation).
Health professions student loans (Health Professions Educational Assistance Act of 1963, as amended in 1965 and 1966) (P.L. 88–129, approved Sept. 24, 1963; 42 U.S.C. (294–294c).	BP...........	Support of student loan funds for students of medicine, dentistry, and other health professions (veterinary medicine added in 1966).	In fiscal year 1967, loans were given to some 21,000 students in health professions.	$25.3 for capital contributions and $10.0 for revolving funds (1967 appropriations).
Improvement grants (Health Professions Educational Assistance Amendments of 1965) (P.L. 89–290, approved Oct. 22, 1965; 42 U.S.C. 295f–295f–4).	BP..........	Basic improvement (formula) grants and special improvement grants to schools for improvement of educational programs; no matching required.	Approximately 170 accredited schools of medicine, osteopathy, dentistry, optometry, and podiatry received basic improvement grants in fiscal year 1967.	$30.0 (1967 appropriation).
Scholarship grants (Health Professions Educational Assistance Amendments of 1965) (P.L. 89–290, approved Oct. 22, 1965; 42 U.S.C. 295g).	BP..........	Grants to schools for scholarships to needy students in health professions, up to $2,500 a year; no matching required.	About 2,000 students of medicine, osteopathy, dentistry, optometry, pharmacy, and podiatry received aid in fiscal year 1967.	$4.0 (1967 appropriation).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Nurse training:				
Grants for construction of new, expanded or improved teaching facilities (Nurse Training Act of 1964) (P.L. 88-581, approved Sept. 4, 1964; 42 U.S.C. 296-296c).	JC, BP, B	Grants for up to 66⅔ percent of costs of construction of new schools or major expansion of existing schools; 50 percent of costs of minor expansion, renovation, or replacement.	Grants through Apr. 30, 1967, will add 2,240 new 1st-year nursing school places.	$25.0 (1967 appropriation).
Nursing student loans (Nurse Training Act of 1964, as amended in 1965 and 1966) (P.L. 88-581, approved Sept. 4, 1964; 42 U.S.C. 297-297g).	JC, BP, B	Support of student loan funds for nursing students.	In fiscal year 1967, loans were given to 17,000 nursing students.	$16.9 for capital contributions and $2.0 in revolving funds (1967 appropriations).
Project grants for improvement of nurse training (Nurse Training Act of 1964) (P.L. 88-581, approved Sept. 4, 1964; 42 U.S.C. 296d).	JC, BP, B	Aid for instructional costs and other costs of improving educational programs.	All accredited schools of nursing may apply for grants.	$4.0 (1967 appropriation).
Payments to diploma nursing schools (Nurse Training Act of 1964) (P.L. 88-581, approved Sept. 4, 1964; 42 U.S.C. 296e).	BP	Formula grants to reimburse schools in part for training students whose enrollment is attributable to Nurse Training Act.	Some 383 schools received aid totaling $3 million in fiscal year 1967.	$5.0 (1967 appropriation).
Opportunity grants for nursing education (Nurse Training Act of 1964, as amended by Allied Health Professions Personnel Training Act of 1966) (P.L. 89-751, approved Nov. 3, 1966; 42 U.S.C. 298c-298c-6).	JC, BP, B	Grants to schools for scholarships to needy students, up to $800 a year (or $1,000 for students in upper half of class).	About 6,750 students will receive grants totaling about $5 million in fiscal year 1968, when the program goes into operation.	$0.75 (1967 appropriation).
Contracts to encourage full utilization of nursing educational talent (Nurse Training Act of 1964, as amended by Allied Health Professions Personnel Training Act of 1966) (P.L. 89-751, approved Nov. 3, 1966; 42 U.S.C. 298c-7).	JC, BP, B	Aid for the purpose of identifying qualified youths of exceptional financial need and encouraging them to undertake training in field of nursing; and publicizing existing forms of financial aid.	State and local educational agencies and other public or nonprofit organizations and institutions may receive contract funds for this purpose.	No funds appropriated in 1967.

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Advanced traineeships for professional nurses (Health Amendments Act of 1956, and subsequent legislation, through Nurse Training Act of 1964) (P.L. 88–581, approved Sept. 4, 1964; 42 U.S.C. 297).	B, G, PG, C..	Grants for traineeships to nurses preparing to be administrators, supervisors, teachers, specialists.	Estimated number of long-term trainees in fiscal year 1967: 2,000.	$10.0 (1967 appropriation).
Allied health personnel training:				
Grants for construction of new, expanded or improved teaching facilities (Allied Health Professions Personnel Training Act of 1966) (P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h).	JC, B, G.....	Grants for up to 66⅔ percent of costs of construction of new schools or major expansion of existing schools; 50 percent of costs of minor expansion, renovation, or replacement.	Accredited training centers for allied health professions eligible for aid.	No funds appropriated in 1967.
Improvement grants (Allied Health Professions Personnel Training Act of 1966) (P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h–1).	JC, B, G.....	Formula grants and project grants to schools for improvement of educational programs; no matching required.	Same as construction grants above.	$2.8 (approximate share of 1967 appropriation).
Advanced traineeships (Allied Health Professions Personnel Training Act of 1966) (P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h–2).	JC, B, G.....	Support for traineeships for advanced training of individuals preparing to be teachers, supervisors, administrators, specialists; no matching required.	Training centers for allied health personnel which are affiliated with a medical or dental school may apply for grants.	$0.75 (approximate share of 1967 appropriation).
Project grants for curriculum development (Allied Health Professions Personnel Training Act of 1966) (P.L. 89–751, approved Nov. 3, 1966; 42 U.S.C. 295h–3).	JC, B, G.....	Project grants for curriculum development; no matching required.	Same as construction grants above.	$0.2 (approximate share of 1967 appropriation).
Public health training:				
Public health traineeships (sec. 306 of Public Health Service Act; 42 U.S.C. 242d).	B, G, PG, C..	Traineeships for graduate or specialized training in public health for physicians, engineers, nurses, and other professional health personnel.	In fiscal year 1967, 1,350 long-term traineeships were awarded; an additional 11,000 persons were supported for short-term training.	$8.0 (1967 appropriation).
Public health training formula grants (sec. 314(c) of Public Health Service Act; 42 U.S.C. 246c).	G, PG, C....	Formula grants to accredited schools of public health.	Grants are designed to offset a portion of difference between tuition income and cost of instruction of Federally sponsored students; 13 schools are now aided.	$3.75 (1967 appropriation).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Public health training project grants (sec. 309 of Public Health Service Act; 42 U.S.C. 242g).	G, PG, C....	Grants to strengthen or expand graduate or specialized public health training programs to meet emerging needs.	In fiscal year 1966, 115 grants were awarded to 85 schools of public health, nursing, engineering, medicine, and dentistry. About 145 projects were supported in fiscal year 1967.	$5.0 (1967 appropriation).
Cancer control training:				
Senior clinical traineeships (general cancer control authority and annual appropriation acts) (current appropriation act, P.L. 89–787; 80 Stat. 1057).	PG (post residency).	Stipends to students planning a career in service to cancer patients.	In fiscal year 1966, 106 physicians received traineeships.	$1.2 (estimated fiscal year 1966 expenditures).
Individual traineeships (nonphysician) (legal authority same as above).	G...........	Stipends to students for advanced training in prevention, control, and eradication of cancer.	Program started in fiscal year 1966 with traineeships to 16 persons; to be much expanded in fiscal year 1967.	$0.1 (estimated fiscal year 1966 expenditures).
Cytotechnology training (legal authority same as above).	6 months' laboratory training after 2 years college.	Aid for teaching costs and student stipends.	In fiscal year 1966, grants made to 61 institutions for training of 450–475 cytotechnologists.	$1.4 (estimated fiscal year 1966 expenditures).
Advanced training in medical technology (legal authority same as above).	Post-basic professional.	Aid for teaching costs and student stipends.	In fiscal year 1966, grants made to 5 schools of medical technology for training an estimated 350 technologists.	$0.2 (estimated fiscal year 1966 expenditures).
Radiotherapy technology training (legal authority same as above).	Technical....	Aid for teaching costs and student stipends.	In fiscal year 1966 grants made to 6 schools for training an estimated 25 students.	$0.15 (estimated fiscal year 1966 expenditures).
Clinical training in community general hospitals (legal authority same as above).	C...........	Aid for instructional costs.	In fiscal year 1966, grants made to some 30 hospitals.	$0.9 (estimated fiscal year 1966 expenditures).
General clinical training (legal authority same as above).	C...........	Aid for instructional costs and other educational activities.	In fiscal year 1966, grants made to 22 institutions and agencies.	$0.8 (estimated fiscal year 1966 expenditures).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Cerebrovascular training—NHI and NINDB:				
Graduate training grants (Public Health Service Act, secs. 412(g) and 433(a); 42 U.S.C. 287a(g), 289c.	G, PG	Aid for teaching costs and student stipends.	For fiscal year 1967, grants approved by NINDB for 5 institutions.	$0.3 (obligated from 1966 funds).
Clinical training grants (legal authority same as above).	C	Aid for teaching costs and student stipends.	For fiscal year 1967, 1 grant approved by NINDB.	$0.03 (obligated from 1966 funds).
Clinical traineeships (legal authority same as above).	G, PG, C	Aid for student stipends.	For fiscal year 1967, traineeships awarded to 2 neurologists.	$0.02 (obligated from 1966 funds).
Clinical cancer training grants—NCI (general cancer control authority and annual appropriation acts) (P.H.S. Act, secs. 402(c) and 433(a); 42 U.S.C. 282, 289c; current appropriation act, P.L. 89–787; 80 Stat. 1057).	BP, G, PG, C.	Project grants for training in cancer prevention, diagnosis, and treatment, and rehabilitation of patients, at undergraduate, graduate, and postgraduate level; aid for teaching costs and student stipends.	Eligible for grants are schools of medicine and principal teaching hospitals, dental schools, schools of public health, and specialized cancer institutions.	$4.97 (fiscal year 1966 funds).
Comprehensive health planning and public health services:				
Planning grants: State formula (Comprehensive Health Planning and Public Health Services Amendments of 1966) (P.L. 89–749, approved Nov. 3, 1966, 42 U.S.C. 246).	Various levels.	Formula aid to States for comprehensive planning in field of health manpower, among other fields; no specific matching required.	Aid for planning of training activities may be included.	$2.5 (1967 appropriation authorization for total program).
Planning grants: Areawide project (legal authority same as above).	Various levels.	Project aid to public or nonprofit areawide planning agencies for metropolitan, regional or local projects; Federal share up to 75 percent of costs.	Same as above	$5.0 (1967 appropriation authorization for total program).
Planning grants: Training, studies, demonstrations (legal authority same as above).	Various levels.	Project aid to public and nonprofit agencies for costs of training, studies, demonstrations.	Aid for training of health planners, among other activities.	$1.5 (1967 appropriation authorization for total program).
Comprehensive public health services grants: Formula block grants (legal authority same as above).	Various levels.	Consolidation of existing formula grants to States for specific diseases and public health problems.	Funds may be used for training, at discretion of States.	$62.5 (1968 appropriation authorization for total program).

Agency and program	Level of training[1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Health service development project grants (legal authority same as above).	Various levels.	Consolidation of existing project grants to public and nonprofit organizations for programs focused on priority health targets.	Funds may be used for training, among other purposes.	$62.5 (1968 appropriation authorization for total program).
Dental auxiliary utilization training (sec. 422(f) of Public Health Service Act; 42 U.S.C. 288a(f)).	BP	Grants to help dental schools establish, expand, or improve programs for teaching undergraduate dental students the effective use of dental auxiliaries, particularly chairside assistants.	46 out of 49 dental schools in the United States are participating in the program.	$2.65 (1967 appropriation).
Heart disease clinical training grants—NHI (general heart disease control authority and annual appropriation acts) (current appropriation act, P.L. 89-787; 80 Stat. 1057).	BP, G, PG, C.	Project grants for training physicians in prevention, diagnosis, and treatment of cardiovascular diseases; aid for teaching costs and student stipends.	Grants available to medical schools and principal teaching hospitals, dental schools, and other institutions capable of providing advanced training.	$0.9 (approved and funded in fiscal year 1966).
Mental health training:				
Mental health graduate training (Public Health Service Act, as amended by National Mental Health Act) (P.H.S. Act, sec. 303; 42 U.S.C. 242a).	G, PG	Teaching costs and student stipends.	In fiscal year 1967, there were some 1,100 training grants (excluding research training) which provided stipends for about 7,000 physicians, psychologists, social workers, nurses, and others.	About $60.0, excluding research training (1967 appropriation).
Mental health undergraduate training projects (legal basis same as above).	B, BP	Teaching costs and student stipends.	In fiscal year 1967, there were 294 grants providing stipends for 1,766 medical, nursing, and other undergraduate students.	$8.5 (1967 appropriation).
Mental health continuing education (legal basis same as above).	C	Teaching costs and student stipends.	In fiscal year 1967, there were 121 grants, with stipends to 75 students.	$2.8 (1967 appropriation).
Mental health inservice training (legal basis same as above).	OJT	Aid for instructional costs.	In fiscal year 1967, grants made to 199 mental hospitals and 99 institutions for the mentally retarded for training of aides, attendants, and others involved in direct patient care.	$6.9 (1967 appropriation).
Mental health experimental and special training projects (legal basis same as above).	Various levels.	Teaching costs and student stipends.	In fiscal year 1967, grants totaled 113 and stipends went to 950 students.	$5.8 (1967 appropriation).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Mental retardation training:				
Senior clinical traineeships (annual appropriation acts) (current appropriation act, P.L. 89–787; 80 Stat. 1057).	G, PG, but not residency.	Stipends for students.	In fiscal year 1965, 5 physicians aided.	$0.05 (fiscal year 1965 expenditures).
Individual traineeships (non-physician) (annual appropriation acts).	BP, G, PG...	Stipends for students.	In fiscal year 1965, 3 persons aided; program expanded greatly in fiscal year 1966.	$0.01 (fiscal year 1965 expenditures).
Training grants to academic institutions (long term) (annual appropriation acts).	BP, G, PG...	Aid for teaching costs and student stipends.	In fiscal year 1966, grants made to 7 institutions.	$0.3 (estimated fiscal year 1966 expenditures).
Planning grants for training (annual appropriation acts).	B, BP, G, PG, C.	Aid for planning (mainly staff salaries).	In fiscal year 1965, grants made to 10 institutions of higher education.	$0.2 (fiscal year 1965 expenditures).
Short-term training grants and contracts (annual appropriation acts).	C............	Aid for teaching costs and per diem and travel for students.	In fiscal year 1965, grants made to 6 institutions and agencies; program expanded greatly in fiscal year 1966.	$0.1 (fiscal year 1965 expenditures).
Student work experience and training (annual appropriation acts).	OJT.........	Pay for students for summer work in health services for mentally retarded.	In fiscal year 1966, grants made to 50 institutions and agencies for jobs for some 700 students.	$0.5 (estimated fiscal year 1966 expenditures).
University-affiliated clinical facility construction (Mental Retardation Facilities and Community Mental Health Centers Construction Act of 1963, title I, pt. B) (P.L. 88–164, approved Oct. 31, 1964; 42 U.S.C. 2661–65).	G, PG, C....	Grants for up to 75 percent of construction costs.	Facilities must aid in clinical training of physicians and other specialized personnel.	$7.5 (1965 appropriation).
Neurological and sensory disease control training:				
Senior clinical traineeships (annual appropriation acts) (current appropriation act, P.L. 89–787; 80 Stat. 1057).	G, PG, C, but not residency.	Stipends for students.	In fiscal year 1955, traineeships were granted to 2 physicians.	$0.05 (estimated fiscal year 1966 expenditures).
Individual traineeships (nonphysician) (annual appropriation acts).	BP, G, PG...	Stipends for students.	In fiscal year 1965, traineeships were granted to 87 individuals (78 in speech and hearing therapy).	$0.3 (estimated fiscal year 1966 expenditures).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Long-term training grants (annual appropriation acts).	TI, BP, G, PG.	Teaching costs and student stipends.	In fiscal year 1965, grants were made to 20 universities or hospitals; trainees numbered 82.	$0.9 (estimated fiscal year 1966 expenditures).
Short-term training grants (annual appropriation acts).	C.	Teaching costs and student per diem and travel.	In fiscal year 1965, grants were made to 18 universities or hospitals.	Included in amount for long-term training grants above.
Regional medical programs (Heart Disease, Cancer, and Stroke Amendments of 1965) (P.L. 89-239, approved Oct. 6, 1965; 42 U.S.C. 299-299i).	Various levels.	Aid for instructional costs, among others.	Support has been provided for planning of continuing education and other specialized training activities; aid will be provided for operational programs as these are approved.	$32.0 (1967 appropriation for total program).
OFFICE OF EDUCATION **Vocational and technical education:**				
Grants to States for occupational training (Smith-Hughes Act, George-Barden Act, Vocational Education Act of 1963) (20 U.S.C. 11-28; 20 U.S.C. 15i-g; P.L. 88-210, approved Dec. 18, 1963; 20 U.S.C. 35c(a)).	HS, JC, TI. . .	Up to 50 percent of instructional costs, teacher training, and ancillary services.	In fiscal year 1966, enrollment in preparatory programs in health occupations totaled about 68,300; about 16,700 others received supplementary training.	$6.0 (estimated 1966 expenditures).
Grants to States for area school construction (Vocational Education Act of 1963; additional authorization under Appalachian Regional Development Act of 1965) (P.L. 88-210, approved Dec. 18, 1963; 20 U.S.C. 35l; P.L. 89-4, approved March 9, 1965; 40 app. U.S.C. 211).	HS, JC, TI. . . .	Up to 50 percent of construction costs.	Many schools constructed under this program provide training in health occupations.	Not available separately for health occupations training facilities.
Work-study program (Vocational Education Act of 1963) (P.L. 88-210, sec. 13, approved Dec. 18, 1963; 20 U.S.C. 35k).	HS, JC, TI. . . .	Part-time employment for students; Federal share not to exceed 75 percent of costs, starting fiscal year 1967.	Aid available to students in all occupational fields including health.	$25.0 (1966 appropriation for total program).
Research and demonstration grants (Vocational Education Act of 1963) (P.L. 88-210, sec. 4(c), approved Dec. 18, 1963; 20 U.S.C. 35c(c)).	HS, JC, TI. . . .	Part of operating cost of research and demonstration projects. No specific matching.	Grants have been made for research and demonstrations on health occupations training.	$17.7 (1966 appropriation for total program).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
MDTA institutional training (Manpower Development and Training Act of 1962, as amended, title II) (P.L. 87–415, approved Mar. 15, 1962; 42 U.S.C. 2581–2602).	HS, JC, TI...	Instructional costs (Federal share not to exceed 90 percent of costs, starting fiscal year 1967) and allowances to trainees.[2]	From inception of program in September 1962 through December 1966, about 53,000 trainees were approved for training in health occupations; an additional 8,000 were approved in 1st 4 months of 1967.	About $67.0 for health occupations training projects approved from September 1962 through December 1966.
ARA institutional training (Area Redevelopment Act of 1961, as amended; merged with title II of MDTA by Manpower Act of 1965) (P.L. 87–27, approved May 1, 1961; 42 U.S.C. 2513).	HS, JC, TI...	Instructional costs (no matching) and allowances to trainees.[2]	Among those trained have been nursing aides, orderlies, and other health personnel.	Included with MDTA training above.
Vocational student loan insurance (National Vocational Student Loan Insurance Act of 1965) (P.L. 89–287, approved Oct. 22, 1965; 20 U.S.C. 981–996).	HS, JC, TI...	Aid for low-cost loans for students.	Students in health occupations are eligible for loans.	$1.0 (1966 appropriation for total program).
Higher education programs:				
Higher education facilities construction—public community colleges and technical institutes (Higher Education Facilities Act of 1963, title I) (P.L. 88–204, approved Dec. 16, 1963; 20 U.S.C. 713).	JC, TI.......	Up to 40 percent of construction costs.	Some aid has been provided for construction of facilities for health occupations training at this level.	$100.8 (1966 appropriation for total program).
Higher education facilities construction—other undergraduate facilities (Higher Education Facilities Act of 1963, title I) (P.L. 88–204, approved Dec. 16, 1963; 20 U.S.C. 714).	JC, TI, B.....	Up to 33⅓ percent of construction costs.	Institutions providing training for health personnel theoretically eligible for aid, unless covered by special legislation.	$357.0 (1966 appropriation for total program).
Higher education facilities construction—graduate facilities (Higher Education Facilities Act of 1963, title II) (P.L. 88–204, approved Dec. 16, 1963; 20 U.S.C. 731–733).	G...........	Up to 33⅓ percent of construction costs.	Institutions providing training for professional health personnel theoretically eligible, unless covered by special legislation.	$60.0 (1966 appropriation for total program).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Higher education facilities construction—construction loans (Higher Education Facilities Act of 1963, title III) (P.L. 88-204, approved Dec. 16, 1963; 20 U.S.C. 741-745).	JC, TI, B, G.	Loans for construction of academic facilities.	Institutions providing training for health personnel theoretically eligible for aid.	$110.0 (1966 appropriation for total program).
Project grants for developing institutions (Higher Education Act of 1965, title III) (P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1051-1055).	JC, TI, B.....	Grants to pay part of costs of projects to strengthen academic programs and administration.	Institutions providing training for health personnel theoretically eligible for aid.	$5.0 (1966 appropriation for total program).
National defense student loans (National Defense Education Act, as amended) (P.L. 85-864, approved Sept. 2, 1958; 20 U.S.C. 421-429).	JC, TI, B, BP, G.	Support for low-cost, long-term loans to students.	Health professions students not covered by Health Professions or Nursing Student Loan Program may receive aid.	$181.0 (1966 appropriation for total program).
Guaranteed loans (Higher Education Act of 1965, title IV, pt. B) (P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1071-1085).	JC, TI, B, BP, G.	Insurance for loans to students.	Health professions students eligible for aid, if not covered by special legislation.	$10.0 (1966 appropriation for total program).
Educational opportunity grants (Higher Education Act of 1965, title IV, pt. A) (P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1061-1069).	JC, TI, B.....	Support for scholarships to needy students.	Program going into operation in 1966-67; health occupations students at this level eligible for aid.	$58.0 (1966 appropriation for total program).
College work-study program (Economic Opportunity Act of 1964, pts. C and D, as amended) (P.L. 88-452, approved Aug. 20, 1964; 42 U.S.C. 2751-2761).	JC, TI, B, BP, G.	Part-time employment for students. Federal share may not exceed 90 percent of costs.	Health occupations students eligible to participate.	$99.1 (1966 appropriation for total program).
Training of teachers of handicapped (P.L. 85-926, approved Sept. 6, 1958, P.L. 88-164, approved Oct. 31, 1963; 20 U.S.C. 611-617).	B (senior year), G.	Aid for teaching costs and student stipends.	In fiscal year 1965, 99 institutions received training grants for speech and hearing therapy; and stipends were awarded to 608 individuals in this field.	$1.7 (fiscal year 1965 expenditures for speech and hearing therapy training).
Community service and continuing education program (Higher Education Act of 1965, title I). (P.L. 89-329, approved Nov. 8, 1965; 20 U.S.C. 1001-1011).	OJT, HS, C...	Aid for costs of service programs, including university extension and continuing education (75 percent of costs in fiscal years 1966 and 1967, 50 percent in fiscal year 1968).	Grants have helped train health technicians, provide refresher courses for professional health personnel, etc.	$10.0 (1966 appropriation for total program).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
VOCATIONAL REHABILITATION ADMINISTRATION [3]				
Long-term training grants (secs. 4(a) and 7(a), Vocational Rehabilitation Act as amended, P.L. 89-333, approved Nov. 8, 1965; 29 U.S.C. 34(a) and 37(a)).	HS, JC, TI, B, BP, G, PG, C.	Aid for instructional costs and student stipends (institution must pay "part" of costs).	In fiscal year 1966, there were 515 grants, with 4,509 individuals receiving traineeships for training in fields involved in rehabilitation.	$21.3 (estimated fiscal year 1966 expenditures).
Short-term training grants (sec. 7(a)(2), Vocational Rehabilitation Act as amended, P.L. 89-333, approved Nov. 8, 1965; 29 U.S.C. 37(a)(2)).	OJT, G, PG, C.	Aid for instructional costs and student expenses (institution or agency must pay "part" of costs).	In fiscal year 1966, there were 175 training grants for the training of 9,300 persons in rehabilitation fields.	$2.4 (estimated fiscal year 1966 expenditures).
State inservice training (sec. 4(a)(1), Vocational Rehabilitation Act, as amended, P.L. 89-333, approved Nov. 8, 1965; 29 U.S.C. 34(a)(1)).	OJT, HS, TI, C.	Aid to State rehabilitation agencies for inservice training of staff; Federal share may not exceed 90 percent of costs.	Grants made to 77 State agencies in fiscal year 1965.	$0.4 (estimated fiscal year 1966 expenditures).
Research and demonstration grants (sec. 4(a)(1), Vocational Rehabilitation Act, as amended, P.L. 89-333, approved Nov. 8, 1965; 29 U.S.C. 34(a)(1)).	Various levels.	Partial support of projects promising substantial contributions to solution of rehabilitation problems.	Some projects have related to training of rehabilitation personnel.	$17.0 (estimated fiscal year 1965 expenditures for total program).
Grants for rehabilitation research and training centers (sec. 4(a)(1), Vocational Rehabilitation Act, as amended, P.L. 89-333, approved Nov. 8, 1965; 29 U.S.C. 34(a)(1)).	Various levels.	Payment of part of costs of instruction, alterations and renovations, some student aid.	Some 17 centers have been established since program began in 1962.	$7.6 (1966 appropriations for total program).
WELFARE ADMINISTRATION [3]				
Work experience program (title V of the Economic Opportunity Act, as amended, P.L. 88-452 (1964); 42 U.S.C. 2922 et seq.).	OJT, vocational.	Aid for costs of projects to provide work-experience for unemployed parents and other needy persons.	As of 1966 an estimated 5,000 persons a year are being trained for health service occupations such as practical nurses, nursing aides, orderlies, etc.	$123.9 (1966 appropriations for total program, to train about 85,000 persons).
Medical assistance personnel training (sec. 1903(a)(2), Social Security Act, as amended, P.L. 89-97, approved July 30, 1965; 42 U.S.C. 1396b(a)(2)).	OJT, G, C....	Aid for 75 percent of costs of teaching and student support, for State medical assistance program personnel.	Program went into effect on Jan. 1, 1966.	No reports as yet.

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Maternal and child health and crippled children's services training project grants (secs. 502(b), 512(b), and 516, Social Security Act, as amended, P.L. 86-778, approved Sept. 13, 1960, and P.L. 89-97, approved July 30, 1965; 42 U.S.C. 702(b), 712(b), and 716).	B, G, PG, C (generally post-basic professional).	Payment for instructional costs and student stipends.	In fiscal year 1965, training grants awarded to some 50 institutions and fellowships awarded to some 240 physicians, nurses, audiologists and speech pathologists, and medical social workers.	$10.6 (estimated fiscal year 1966 expenditures).
DEPARTMENT OF LABOR				
Manpower development and training—institutional training (secs. 203 and 231, Manpower Development and Training Act of 1962, as amended, P.L. 89-15, approved April 26, 1965; 42 U.S.C. 2583 and 2586).	HS, JC, TI...	Aid for instructional costs, trainee allowances.[4]	See Office of Education......	$160.5 (fiscal year 1966 expenditures for training allowances for total program; expenditures for instructional costs appear under Office of Education above).
Manpower development and training—on-the-job training (sec. 204, Manpower Development and Training Act, as amended, P.L. 87-415, approved Mar. 15, 1962; 42 U.S.C. 2584).	OJT.........	Aid for instructional costs of on-the-job training of workers for unfilled jobs.	Since 1962 more than 200 contracts have been made with hospitals, nursing homes, and other institutions for training in more than 50 health-care occupations; as of June 1966, programs involving almost 3,000 trainees underway under contract with American Hospital Association's Research and Educational Trust alone.	$54.2 (fiscal year 1966 expenditures for total program).
ARA on-the-job training (sec. 241, Manpower Development and Training Act of 1962, as amended, P.L. 89-15, approved Apr. 26, 1965; 42 U.S.C. 2610a).	OJT.........	Same as above..............	Training has been provided in health occupations.	$0.7 (fiscal year 1966 expenditures for total program).
Manpower development and training—experimental and demonstration projects (sec. 105, Manpower Development and Training Act of 1962, as amended, P.L. 89-15, approved Apr. 26, 1965; 42 U.S.C. 2572).	OJT, HS, JC, TI.	Aid for instructional and other project costs, with no matching required.	Some projects have involved training of health personnel.	$19.2 (fiscal year 1966 expenditures for total program).

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
Neighborhood Youth Corps (title I, pt. B, Economic Opportunity Act of 1964, as amended, P.L. 88–452, approved Aug. 20, 1964, P.L. 89–253, approved Oct. 9, 1965, and P.L. 89–794, approved Nov. 8, 1966; 42 U.S.C. 2731–2736).	OJT.........	Payment of up to 90 percent of costs of providing part-time work and work experience for actual or potential school drop outs age 16–21.	Among the groups trained have been nursing aides, hospital orderlies, and other types of health personnel.	$254.0 (estimated fiscal year 1966 expenditures for total work training program).
DEPARTMENT OF COMMERCE				
Area redevelopment manpower training (Area Redevelopment Act of 1961, as amended; now merged with title II of Manpower Development and Training Act) [5] (P.L. 87–27, approved May 1, 1961; 42 U.S.C. 2501–25).	OJT, HS, JC, TI.	Aid for instructional costs and, in case of institutional training, training allowances.	In the period November 1961 to June 1965 about 6,500 persons were approved for training in health occupations, including nursing aides, psychiatric aides, and others.	$22.0 (fiscal year 1966 expenditures for total program; including $7.9 million for institutional training costs, $13.4 million for training allowances, and $0.7 million for on-the-job training).
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT				
College housing program (Housing Act of 1950) (12 U.S.C. 1749–1749c).	JC, TI, B, BP, G, PG.	Long-term loans for construction of housing and other service facilities.	Loans have been made specifically for housing for hospital nursing schools and for interns and residents, as well as for college housing generally.	In fiscal year 1966, loans for housing of nursing students and interns and residents totaled $3.0 million.
OFFICE OF ECONOMIC OPPORTUNITY				
Community action program (title II, pt. A, Economic Opportunity Act of 1964, as amended, P.L. 88–452, approved Aug. 20, 1964, P.L. 89–253, approved Oct. 9, 1965, P.L. 89–794, approved Nov. 8, 1966; 42 U.S.C. 2782–2794).	Various levels.	Assistance for community action programs mobilizing resources against poverty, which may include training of personnel.	An example of aid for training in health occupations is the Home Health Aide pilot training project, which trained and placed 3,000 persons by the end of fiscal year 1966.	$2.7 for home health project alone in fiscal year 1966.

Agency and program	Level of training [1]	Type of aid	Extent of support for health occupations training	Amount of aid (millions)
VISTA (title VIII, Economic Opportunity Act of 1964, as amended, P.L. 89–794, approved Nov. 8, 1966; 42 U.S.C. 2991a–2991e).	Intensive 6-week course prior to working.	Payment of costs of training and employing volunteers.	Volunteers have worked in hospitals and health programs, and programs for the mentally ill or retarded.	$15.9 (fiscal year 1966 obligations for total program.)
Job Corps (title I, pt. A, Economic Opportunity Act of 1964, as amended, P.L. 88–542, approved Aug. 20, 1964, P.L. 89–253, approved Oct. 9, 1965, P.L. 89–794, approved Nov. 8, 1966; 42 U.S.C. 2711–2722).	OJT, vocational.	Support of residential training centers for youth from impoverished homes, including construction and operation.	Training in health service occupations is provided at some centers.	$303.5 (fiscal year 1966 obligations for total program).
VETERANS' ADMINISTRATION				
GI Bill educational benefits sec. 2, Veterans Readjustment Benefits Act of 1966, P.L. 89–358, approved March 3, 1966; 38 U.S.C. 1651–1686).	Various levels.	Aid to students ($100–$150 a month, depending on number of dependents).	Veterans preparing for health occupations are eligible for aid.	Program just going into effect.

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[1] Key to level of training: OJT—on-the-job training, HS—high school, JC—junior college, TI—technical institute, B—baccalaureate, BP—basic professional, G—graduate or specialized, PG—post-graduate, C—continuing.

[2] Allowances to trainees for up to 104 weeks of training, administered through the Department of Labor.

[3] The Social Rehabilitation Service was established on August 15, 1967, to carry out the functions of the Welfare Administration, the Vocational Rehabilitation Administration, the Administration on Aging, and the Mental Retardation Division of the Bureau of Health Services of the Public Health Service.

[4] Aid for instructional costs under institutional training programs administered through Office of Education.

[5] Program administered in cooperation with Office of Education and Department of Labor.

NOTE.—Excludes: Research training support, environmental health training programs, medical library training, training programs for limited groups (e.g., Indians, children of deceased veterans, etc.), and direct Federal training programs.

Appendix B

Annotated Bibliography of State Reports on Health Manpower

Alabama

Dunbar, John B. "Expanding Needs in the Paramedical Professions." *University of Alabama Extension News Bulletin* 23: 1–3, August 1965.

Total job openings in 1965.

"The Health Careers Council, from interviews with leaders around the State, estimates that Alabama could now provide approximately 7,000 jobs in the health-related professions. Most of these are in the field of nursing. This number does not include jobs for subprofessional personnel such as orderlies, file clerks, and assistants of various sorts. If we added these, more than 17,000 jobs would now be open. . . . Regardless of the route that is taken, the State must divest itself of the notion that paramedical workers are a byproduct of routine hospital and university operation."

Alaska

Clark, Dean A., and Associates. "Health Service Resources, a Profile of the State of Alaska." Pittsburgh, Pa., Graduate School of Public Health, University of Pittsburgh, April 12, 1965, 52 pp.

Ratio of M.D.'s, R.N.'s, and psychologists to 1960 population.

"In the category of technicians, either medical or dental, therapists and other health workers, the State of Alaska falls considerably behind the U.S. averages. This is applicable also in the fields of practical nursing, midwives, pharmacists, dietitians, dentists, and optometrists."

Arizona

"Interim Report of the Joint Committee To Study Nursing Needs and Resources in Arizona." *Arizona Nurse* 18: 23–38, November–December 1965.

R.N. enrollment in 1965 was 1,089.
R.N. enrollment needed by 1975 to meet goal is 1,500.
L.P.N. enrollment in 1965 was 164.
L.P.N. enrollment needed by 1975 to meet goal is 700.

Nurses for Arizona Committee. Nurses for Arizona. The Committee, May 1964.

"By 1970, it is estimated that Arizona will need 7,700 or an increase of 2,563 registered nurses."

Arkansas

"Statistical Report of the Arkansas State Board of Nurse Examiners." January 1, 1965 to September 1, 1965.

Nursing figures, present only.

"Based on 350 per 100,000 population, we need 6,252 R.N.'s and we only have 2,595."

"Based on 233 per 100,000 population, we need 4,162 L.P.N.'s and we only have 2,690."

California

State of California, Department of Public Health, Division of Community Health Services. "Compensation of Full-time Professional and Technical Public Health Personnel in Local Health Departments in California." March 1965.

In public health departments, there are 408 vacancies out of a total budgeted force of 5,539. This includes 103 vacancies of 1,774 budgeted positions in nursing, and 32 vacancies of 129 positions in therapy, both occupational and physical.

Colorado

"Toward Statewide Planning for the Education of Nursing Practitioners in Colorado, Report of the Colorado Committee." Sponsored by the Colorado League for Nursing and the Western Council on Higher Education for Nursing, Colorado League for Nursing, Denver, Colo., August 1963.

Nursing service personnel employed by the health services and educational programs for nursing were assessed as a basis for the later development of guidelines and criteria for the expansion of education programs. The study includes a regional analysis of registered professional and licensed practical nurses by type and characteristics of their work places as well as an analysis of educational resources for the years 1955–62. Needs and demands for personnel are estimated.

Connecticut

"Nursing Needs and Resources in Connecticut, A Report of the Connecticut Commission on Nursing, 1966." Sponsored by the Connecticut League for Nursing, Connecticut Nurses Association and Connecticut Hospital Association.

The Commission studied nursing personnel resources and needs in hospitals, public health agencies, nursing homes, and schools of nursing. Action for meeting needs was recommended in the areas of planning, recruitment, job satisfaction, and post graduate education. Priority was given to the need for properly organized and financed continuous planning for nursing as a responsibility of the State Departments of Health, Education, and Labor and all other public and private agencies concerned.

Georgia

Fincher, Cameron. "Nursing and Paramedical Personnel in Georgia, a Survey of Supply and Demand." Atlanta, Ga., Georgia State College, December 1962.

Of 11 occupations surveyed, the need by 1970 was estimated at 21,329. Of this figure, the maximum number that can be trained under present conditions is 7,416.

Hawaii

Kosaki, Mildred D. "Nursing and Nursing Education in Hawaii." Report No. 3. Honolulu, Legislative Reference Bureau, University of Hawaii, 1962, 117 pp.

Present supply and 1970 needs.

Using a ratio of 350 nurses per 100,000 population, the Western Interstate Commission for Higher Education estimated in 1960 that Hawaii would need in 1970 a total of 1,889 additional nurses including all levels of training, and that this would mean 189 annual graduates needed. In 1960, Hawaii had an annual 107 graduates. This compares with a figure of 108 annual graduates in 1958.

Idaho

Consultants from the Department of Medical and Hospital Administration of the Graduate School of Public Health, University of Pittsburgh. "Hospital and Health Resources in Idaho." Boulder, Colo., Western Interstate Commission for Higher Education, May 1964, 20 pp.

Ratios to 1960 population for several occupations.

"Idaho's 235 registered nurses in active practice per 100,000 population is somewhat lower than the national ratio of 297 R.N.'s per 100,000 population. Idaho has only 5.2 social workers and but 0.8 occupational therapists per 100,000 while the country at large has 19.5 social workers and 3.7 occupational therapists per 100,000. Data for other professions indicate that Idaho does rather poorly in the case of dietitians, physical therapists, podiatrists, and psychologists."

Illinois

Health Careers Council of Illinois. "IHA Study Reveals Massive Increase in Personnel Vacancies." *Pathways* Issue No. 1, November 1965.

Total budgeted vacancies 1963, 1965.

"All doubts about the extent of personnel vacancies in Illinois hospitals have been removed by the just released study of budgeted hospital personnel vacancies, conducted by the Illinois Hospital Association. Total budgeted vacancies have increased 79 percent from 1,950 vacancies reported in 1963 by 284 hospitals to 3,485 reported in 1965 by only 270 hospitals. Add your own estimate of the number of nonbudgeted vacancies that exist as well as the number of vacancies existing in Illinois hospitals not responding to the survey."

Indiana

Indiana Employment Security Division, Research and Statistics Section. "Occupational Shortages in Indiana Hospitals." Indianapolis, The Division, November 1963, 12 pp.

Present needs and present training capacities

"The majority of the hospitals cannot train personnel for their needs. Training programs are both costly and time consuming, and many hospitals have neither the funds nor the facilities for conducting training."

"Nurses for Indiana, Present and Future; Survey Report of the Nursing Needs and Resources in Indiana, 1967." Indiana Committee on Nursing.

The Statewide demand for, distribution and characteristics of the supply of professional and licensed practical nurses and aides; their working conditions; and educational preparation were assessed for all fields of employment. Recommendations developed from the 2-year study give directions for improving the quantity and quality of the supply for meeting estimated needs up to 1975 in relation to educational programs, population growth, and health trends.

Kansas

Gentry, Frank L. "Education Is Helping to Solve Longstanding Personnel Shortages." *Hospitals* 39: 55–60, June 1, 1965.

Figures from 117 reporting hospitals.

"Only recently, 117 hospitals in Kansas responded to a hurried survey and tallied 1,168 job openings in some 28 positions for which they would have immediately employed a trained person if he had been available. Kansas now has six schools, providing 12-month courses for licensed practical nurses; it seems safe to predict that Kansas hospitals could absorb the graduates of 15 L.P.N. schools . . ."

Kansas Health Facilities Information Service, Inc. "A Study of Nursing Needs and Goals in Kansas Through 1975." Pub. No. 108. August 1965 [47 pp.]

R.N.'s:
  Employed, 1964—6,203.
  Needed, 1964—7,002.
  Needed, 1975—7,913.

L.P.N.'s:
  Employed, 1963—1,096.
  Needed, 1964—3,867.
  Needed, 1975—4,711.

Committee on Manpower, Governor's Council on Mental Retardation. Report on Initial Meeting, March 4, 1965.

Mental health personnel needs—1965 and 1976.

Kentucky

Teague, Russel E. "Health Manpower Statistics." February 7, 1966 (unpublished).

Present supply for many health occupations.

Maine

"Nursing Personnel Resources: An Analysis of the Supply of Registered Professional Nurses in Maine." Health Facilities Planning Council of Maine, 1966.

The 1966 supply of licensed professional nurses was analyzed as to its distribution throughout the State. Inactive nurses were surveyed by questionnaire to elicit their interest in returning to work for determining the potential work force within this pool for meeting nurse manpower requirements.

Massachusetts

"Preliminary Report—Survey of Professional Nurses and Practical Nurses with Active Massachusetts Registrations and Licenses July–September 1966." Research Department, Economic Research and Special Reports, The Commonwealth of Massachusetts, Division of Employment Security, Boston, Mass., November 1966.

Active and inactive professional and practical nurses licensed in the State in 1966 were surveyed by questionnaire to determine the potential work force. Measures for encouraging more inactive nurses to return to work were recommended.

Michigan

"Nursing Needs and Resources in Michigan, Today and Tomorrow, a Report to the People of Michigan From the Michigan League for Nursing and Michigan Nurses Association, 1966."

The report of the 2-year study for planning for nursing service and educational needs and resources includes estimates of the numbers, kinds and levels of educational preparation of nursing personnel existing and needed for regions within the State. Guidelines and recommendations for increasing the supply and the expansion of educational facilities are included.

Minnesota

Health Manpower Study Commission. "Health Manpower for the Upper Midwest. A Study of the Needs for Physicians and Dentists in Minnesota, North Dakota, South Dakota, and Montana." St. Paul, Louis W., and Maud Hill Family Foundation, June 1966, 135 pp.

"The Commission strongly recommends that the body charged with regional planning of health services lay plans for continuing regular data collection and study of material relative to such professional groups as nursing, medical technology, physiotherapy, occupational therapy, dental hygienists, and others that are needed to maintain a high quality of medical and dental care and to meet the demands of an affluent and growing population . . . The Commission lastly recommends that the junior colleges incorporate programs for training health manpower among their educational offerings."

Montana

Consultants from the Department of Medical and Hospital Administration of the Graduate School of Public Health, University of Pittsburgh. "Hospital and Health Resources in Montana." Boulder, Colo., Western Interstate Commission for Higher Education, May 1964, 20 pp.

Ratios to 1960 population for several occupations.

"With only 83 licensed practical nurses per 100,000 people, Montana is well below the national average of 115 per 100,000. . . . The health professions with which Montana is relatively poorly supplied include medical record librarians, pharmacists, podiatrists, and psychologists, in regard to all of which it is below the national average. Finally . . . Montana is far below the national average for social workers, having a ratio of 8.2 per 10,000, compared to a figure of 19.5 per 100,000 nationally."

Nebraska

Martin, Cora Ann. "Nebraska's Nurse Supply, Needs and Resources: 1966." Nebraska Department of Health, Section of Hospitals and Medical Facilities, March 1967.

This reappraisal of needs and updating of the 1951 Statewide study includes data on the numbers of registered professional and licensed practical nurses and aides by fields of practice for 1966; the characteristics of educational programs and students; and numerical needs for nursing personnel expressed by hospitals and other institutions. Acceleration of advanced training for leadership positions, redesign of the educational system, increased financial aid for students, and improved salaries and working conditions for nurses are recommended.

Nevada

Consultants from the Department of Medical and Hospital Administration of the Graduate School of Public Health, University of Pittsburgh. "Hospital and Health Resources in Nevada." Boulder, Colo., Western Interstate Commission for Higher Education, May 1964, 20 pp.

Ratios to 1960 population for several occupations.

Nevada has ratios below those for the Nation with respect to dietitians, medical technologists, occupational therapists, optometrists, and veterinarians.

Nursing Committee of Nevada Public Health Association. "Nursing in Nevada, 1964." Nevada Tuberculosis and Health Association, 1964 [121 pp.].

Using a ratio of 350 per 100,000 population, Nevada will need 1,586 R.N.'s in 1970, which constitutes an increase of 919 over the 1963 supply.

New Mexico

Dillman, Everett G. "New Mexico Nursing Needs and Resources: The Situation." Albuquerque, University of New Mexico Bureau of Business Research, 1964, 19 pp.

Present supply and needs to 1970.

R.N.'s:

1964 supply—2,227 (201 per 100,000 population).
1964 unmet need in hospitals and other institutions—315.

"Computed conservatively, the annual demand until 1970 will require at least 100 nurses more than the expected net increase in supply. This probable annual deficit is cumulative, and can only serve to curtail nursing services available in the State, unless it is eliminated by definite action programs."

Mariani, Rose R. "Survey of the Manpower and Training Needs of New Mexico State Institutions." Albuquerque, the University of New Mexico School of Medicine, January 1965, 148 pp.

Present supply and need in State institutions.

New York

"Study of Nurse Education Needs in the Southern New York Region 1964–65." Hospital Review and Planning Council of Southern New York, Inc.

Needs for increasing the nurse supply particularly in relation to hospitals and institutions; and educational resources, their capabilities, and potential for expansion are analyzed for 14 counties in New York State. Recommendations for meeting educational requirements are made.

North Carolina

Employment Security Commission of North Carolina. "Manpower and Training Needs for Medical and Health Service Occupations in North Carolina." Raleigh, N.C., Bureau of Employment Security Research, September 1963, 63 pp.

1963 supply and 1963, 1966 needs.

Hospitals, medical institutions, and schools now do extensive training in many of the 34 occupations covered in this survey. An examination of the survey data indicates that such training will meet only 73 percent of the need by yearend 1966. Thus, additional training will be required to meet anticipated shortages of about 3,075 by yearend 1966.

Brown, Ray E. "Report of Survey of Nursing Education in North Carolina." Sponsored by North Carolina Board of Higher Education, North Carolina Medical Care Commission, and the North Carolina State Board of Education, July 1964.

The system for educating professional nurses in the State was analyzed in this study which included 5-year trend data on the input and output of schools and the academic qualifications of employed nurses. Numerical estimates of needs were not delineated but higher education including the junior colleges was charged with responsibility for meeting the needs for well prepared nurses at all levels. A continuing joint committee for assuring systematic planning for nursing education on a Statewide basis was recommended.

Ohio

"Projected Needs for Nursing Education in Ohio, a Report to the Board of Regents." Ohio State Nurses Association, Columbus, Ohio, 1964.

Guidelines for developing nursing programs as part of the State's master plan for higher education are presented in this report. An assessment of the characteristics of and factors effecting programs, facilities, and resources for initial and graduate professional nurse education and practical nurse education was supported by a compilation of trend data from 1956–63. Estimates of the number of nurses needed to be educated by 1975 was related to the State's present supply and the future needs of service agencies.

Oklahoma

Oklahoma Mental Health Planning Committee. "Long Range Plan for Mental Health in Oklahoma." Oklahoma City, The Committee [no date], 65 pp.

"All service professions are in short supply. Demands are increasing out of proportion to population increase."

Waddle, France I. "Planning for Nursing Education—a Study of Current Resources and Future Needs." Sponsored by Oklahoma League for Nursing, Oklahoma State Nurses' Association, Oklahoma Board of Nurse Registration and Nursing Education, August 1965, unpublished.

The number of active and inactive professional and licensed practical nurses in the State in 1964, characteristics of the supply, needs for nursing service, levels of staffing, functions of personnel and types of in-service education programs in hospitals, nursing homes, and public health agencies were studied in relation to educational resources. Needs for 1970 were estimated and feasible goals determined.

Oregon

"Report of Committee on Manpower and Training, 1963–65." State of Oregon Division of Mental Health, February 9, 1965, 20 pp.

Pennsylvania

Pennsylvania Health Careers Committee, Pennsylvania Health Council. Health Careers." Harrisburg, The Committee [1965].

General employment outlook in many health occupations.

"The demand for public health nurses far exceeds the supply."

Rhode Island

Hospital Association of Rhode Island. Personnel Employment and Training Survey. January 1966.

In a survey of two hospitals, there were 152 R.N.'s employed, with 50 budgeted vacancies open, and 111 LPN's employed, with 28 budgeted vacancies.

"A Plan for the Consolidation of Public Health Services in Rhode Island." New York, Community Research Associates, Inc., 1965, 126 pp.

Present employment figures for several occupations.

"Nursing Needs and Resources in Rhode Island." A survey by the Rhode Island Council of Community Services, Inc., in cooperation with the Rhode Island League for Nursing. August 1964, 84 pp.

1963 data on R.N.'s and L.P.N.'s including age, education, and type of employment.

South Carolina

South Carolina Hospital Association and South Carolina Employment Security Commission. "Manpower Requirements for Health Facilities in South Carolina." Columbia, S.C., The Commission, March 1966, 54 pp.

"Manpower requirements in medical and health services in South Carolina will increase substantially in the next 5 years . . . Employment totaled approximately 17,400 in the 81 surveyed occupations . . . The number of additional workers required to meet both expansion and replacement needs will total nearly 6,600 by 1967 and 14,900 by 1970."

South Carolina Hospital Association. "Crisis in Health Care in South Carolina." Preliminary report on professional, paramedical, and technical personnel, November 9, 1964.

Present supply and needs for all categories of hospital personnel.

"According to a survey of 70 South Carolina hospitals in August 1964, there is a shortage of 1,381 hospital employees . . . The shortage of professional and paramedical personnel is approximately 775, or 20.8 percent.

South Carolina Hospital Association's Committee on Hospital Careers. "Medical Technology in South Carolina and Hospital Dietitics in South Carolina." *Hospital Careers Digest,* vol. II, Nos. 2, 3, October and November 1964.

Present supply figures.

Alford, Elizabeth M. "Nursing in South Carolina, 1964." Columbia, S.C., South Carolina Hospital Association, December 1964, 55 pp.

A statistical study of the quantity of nurses and the quality of their training including figures for need through 1970.

South Carolina State Nurses' Association. "Nurses for South Carolina." (1964), 15 pp.

Projected needs for 1970 .

The ratio of 187 nurses per 100,000 population in 1962 is far below the national ratio. Using a ratio of 300 per 100,000 population, in 1970 the State will need 7,944 R.N.'s, an increase of 3,602 over the supply in 1960. The State will also need 4,766 L.P.N.'s, an increase of 3,156 over the 1960 supply.

Texas

"Report of the Interim Senate Committee Studying Nursing Profession Needs in Texas." Presented to the 60th Texas Legislature, 1967.

Data and information collected and compiled to support and substantiate the State's needs in relation to the education, practice, and utilization of nurses as presented in public hearing are the substance of this report.

Vermont

"Report of the Task Force on Mental Health Manpower." Appendix to the Vermont Mental Health Plan. Montpelier, Vt., Vermont Department of Mental Health, August 1965, 26 pp.

Present supply and budgeted vacancies in mental health and mental retardation positions.

There are 20 unfilled budgeted positions in the mental health and mental retardation fields in Vermont, including six positions for social workers, as of May 1, 1965.

"Nursing Needs and Resources in Vermont 1966–75, A Report to the People of Vermont." Vermont State Nurses Association, Inc., 1967.

Positive steps to increase the number and improve the quality of nurses educated in Vermont are recommended in this 2-year study intended as a basis for Statewide planning for nursing. Study data highlighted the need for utilization studies and improving career and employment incentives and recruitment techniques for licensed nursing personnel. Projection of needs for 1975 are included.

Virginia

McGlothlin, William J. "Educational Programs in Virginia for Fields Related to Health." Staff Report No. 6. Richmond, Va., The Higher Education Study Commission, Commonwealth of Virginia, 1965, 55 pp.

1965 supply and demand figures for 17 occupations.

"One estimate by the Virginia Council on Health and Medical Care shows only 557 dental assistants in full-time employment, less than half the 1,200 needed. Most of these have been trained by individual dentists in offices rather than in any formal program. . . . There are too few medical technologists—they cannot be trained fast enough to meet the demand. It is estimated, for example, that the need in Virginia is for perhaps 2,000 medical technologists, but there are only about 800 in the State. . . . This number [graduated from training schools in Virginia now] is insufficient to meet the need of replacements caused by turnover, let alone satisfying the needs caused by the expansion of laboratory tests. The number of laboratory tests has doubled in the last 5 years alone, and hospital beds and outpatient visits have increased at the same time. Growth of the laboratories has been almost astronomical."

Wyoming

Consultants from the Department of Medical and Hospital Administration of the Graduate School of Public Health, University of Pittsburgh. "Hospital and Health Resources in Wyoming." Boulder, Colo., Western Interstate Commission for Higher Education, May 1964, 20 pp.

Ratios to 1960 population for several occupations.

"Wyoming's number of licensed practical nurses, 104 per 100,000 population, is somewhat lower than the average of 115 per 100,000 for the United States as a whole. . . . [Wyoming] is well below the averages for the country as a whole in regard to occupational therapists, podiatrists, psychologists, and social workers . . ."

Appendix C

Selected Statements of Shortages in the Medical Specialties

Supply shortages are seen in many medical specialties by professional observers. This is a preliminary review of the literature in this area for 16 specialties. Attention has been given primarily to clinical practice, with some references to needs for teaching and research. Included in this review are papers dealing with general and family practice.

Aerospace Medicine

The gap between supply and demand is widest in research and development. There is little hope of closing the gap in the foreseeable future. The shortage becomes more apparent when one considers clinical aerospace medicine (*1*).

Anesthesiology

"There are not enough physician specialists to administer all of the anesthetics in this country. It is unlikely that there ever will be" (*2*).

Further, "there is a critical shortage of personnel to administer anesthetics, to teach the science of anesthesia, and to conduct research in this field" (*3*).

"About 25 million operations will be performed this year, most of them requiring anesthesia. With scarcely enough anesthesiologists for daily surgery, the acute shortage is further aggravated by the urgent need for their services in certain non-operative diagnostic and treatment procedures commonly used.

"According to a study made 4 years ago, only about 40 percent of the estimated need for anesthesiologists was being met. Since then there have been even greater demands for these physicians whose special skills are being extended beyond operating rooms and intensive care units to the care of patients for respiratory failure from accidents, poisoning, asphyxia of the newborn, or other causes.

. . . I believe the shortage of anesthesiologists will get worse" (*4*).

Dermatology

The dermatologist does not, and cannot, assume the bulk of the practice in his field. A recent decline in the practice of clinical dermatology has been noted, while there has been a great expansion in the field of research. This growth in research has come at the expense of unmet personnel needs (*5*).

It is not possible for the trained specialist to assume the burden now or in the future (*6*).

General and Family Practice

"Growth in the number of specialists among American physicians has been going on at such an increasing rate, that today 80 percent of the country's medical graduates study for specialty practice. The necessity of this development of specialized care in every field of medicine is not to be disputed. Nor can we overlook the contributions to medical understanding which have developed through specialty practice. But if we reach the point—as I think we have—at which the specialist is crowding the generalist off the scene, then there is reason for very serious concern" (*7*).

"Various paramedical professions also provide services once considered the province of the family doctor . . . These new kinds of medical aides create a new difficulty. As the patient's care is further fragmented, there is an even greater need for coordination by a family doctor" (*8*).

"There are, of course, some excellent general practitioners, and there are some specialists who administer continuing and comprehensive care of high quality. But there are not enough such men, and there is not enough of the service they offer—as most patients, physicians, and legislators agree . . . Many leaders of medical thought have proclaimed the desirability of training physicians to offer comprehensve medical care of high quality far higher than that provided by the typical practitioner of the past . . . One of his qualifications must be a thorough knowledge of and access to the whole range of medical services of the community . . . We suggest that he be called a 'primary physician.' " (*9*).

Internal Medicine

"If internists were to provide continuous care for all patients there should be at least one internist for every 750 persons. Actually the ratio is less than one per 14,000, and they are not evenly distributed throughout the country. They tend to congregate in urban areas, with over one-quarter in New York and California" (*8*).

Neurology

There is a serious shortage of adequately trained neurologists. We will need 2,140 practicing neurologists in 1970—we now have 547 (*10*).

We must strengthen training programs . . . not only in numbers but in quality of trainees . . . (*11*).

Obstetrics and Gynecology

The majority of obstetrical and gynecological practice is handled by the general practitioner. In 1959, William Mengert warned that the shortage was expected to become more acute. (*12*). Nicholas J. Eastman, in 1959, stated, "This is the problem—a 50 percent increase in births between now and 1970 and a diminishing number of physicians in relation to population" (*13*). In addition to a deficiency in clinical personnel, an insufficient supply of specialists willing to devote themselves to teaching and research in obstetrics and developmental biology was noted by editorials in the *American Journal of Gynecology and Obstetrics* in 1961.

William F. Bradford, in his presidential address at the 26th Annual Meeting of the South Atlantic Association of Obstetricians and Gynecologists, comments that: "The planning and consideration of the medical needs of the aged have not kept up with the growth factor . . ." (*14*).

Ophthalmology

"Most of the problems that confront opthalmology today can be traced primarily to the lack of sufficient number of ophthalmologists . . . appointments are in many places deferred for 2 or 3 months because the average ophthalmologist cannot keep pace with his tremendous workload . . . The practicing ophthalmologist has become spread so thin and is trying to cover so much ground that necessarily he must cut corners in practicing good ophthalmology" (*15*).

Orthopedics

The Conference of Heads of Departments of Orthopedic Surgery of Medical Schools on Department Sponsored Research Programs expressed the need for clinical researchers in orthopedics. It was also pointed out that inadequate department staffs are adversely affecting these research activities (*16*).

Otolaryngology

We need more otolaryngologists and fewer general surgeons. (*17*).

Pathology

The opportunities in the next 10 years in pathology will require at least twice as many pathologists as there are currently practicing (*18*).

There will be a shortage of at least 2,000 pathologists if the present rate of training remains unchanged. There will be shortages in teaching and research, as well as in the practice of forensic pathology (*19*).

In clinical practice our need is for many good pathology generalists, some pathology specialists with 5 or 10 years prior general experience, and some pathology specialists with less formal training in general pathology and more in a special aspect of pathology or in another discipline, such as biochemistry or even zoology or genetics. (*20*).

Pediatrics

The ratio of pediatricians to children under 15 years of age was 1: 6,135 in 1961 (*21*). Charles May estimated that the average pediatrician cares for approximately 1,000 children (*22*). If we use this guideline, we would need over 69,000 pediatricians, more than six times the number in full-time practice in 1961. However, if the role of the pediatrician excludes general care of children, the 1961 ratio is "not far from adequate" (*23*).

The New Physician presented a review of the opportunities in pediatrics which suggests that in the recognized subspecialities, allergy and cardiology, and in those that are not yet established as subspecialties, endocrinology, genetics, hematology, and neurology, the demand for qualified clinical, teaching, and research personnel far exceeds the supply (*24*).

"Recent publications have emphasized the apparent increase of incidence in the occurrence of single and multiple handicaps in children. The development of treatment programs which are comprehensive in scope has not kept pace with the needs presented by these patients" (*25*).

Pediatric Radiology

"The maturation of pediatric radiology into a distinct medical specialty has resulted from the establishment. and development of pediatric hospitals, these institutions requiring specialized radiologic opinions which could be obtained only from those physicians having a knowledge of both pediatrics and radiology" (*26*).

Physical Medicine

"Of the many reasons for holding international congresses of physical medicine . . . one is the possible relationship to the advancement of physical medicine, so that more people in more countries may benefit from it, more hospitals budget for it; so that more research and education will result" (*27*).

In a 1966 study by the Commission on Education in Physical Medicine and Rehabilitation, various estimates of projected needs for physiatrists were compiled for the United States as a whole. Estimates range from 1,191 to 2,150 currently needed. In 1966, there were 511 living Board-certified physiatrists in the United States and its possessions, with an estimated total of practicing physiatrists of 780. The VRA- and VA-supported residency training programs in this specialty are producing less than 100 a year (*28*).

Psychiatry

In 1961, the Joint Commission on Mental Health, chosen in 1955 to consider in depth the needs and resources of the mentally ill in the United States and to make recommendations for action, found the manpower shortage basic to the inadequacy of mental health services. In 4 years following the inception of the Commission's studies in 1955, the ratio of psychiatrists to population had risen from one in every 18,000 to one in 15,000 (*29*).

In its 1961 report, the Joint Commission on Mental Health concluded that since the U.S. population is expected to increase by 20 million in the next decade, an additional 200,000 persons will need treatment for major mental illness (*30*). Furthermore, as facilities become more widely available, the population increase is not the only factor involved in increased demand for treatment. The Commission reported: "We can conclude that the United States would quickly absorb the services in the next 10 years of two or three times as many psychiatrists as it now has—that is 24,000 to 36,000" (*31*).

The fact that a majority of psychiatrists prefer a full-time private practice in big cities accounts in large measure for the great manpower shortage in public mental hospitals and community clinics. Henry A. Davidson comments that most American Psychiatric Association members are in private practice, receiving so good an income that they are unable to devote time to unpaid community services in clinics, public hospitals, guidance centers, and similar institutions, even though most of these psychiatrists received part or all of their graduate education with assistance from the community. Almost every public hospital, community clinic, and the like, says Davidson, is desperately understaffed (*32*).

George Albee says that in view of the rapid increase in availability of psychiatric beds in general hospitals, there will be an increased demand for professional personnel to staff these facilities (*33*). In reference to the manpower shortage in the State and county mental hospitals, he states that almost one quarter of 3,000 available positions for physicians in mental hospitals were unfilled (*34*). Albee found that a large proportion of physicians in public mental hospitals are foreign interns and residents (*35*).

Adding up the needs in relation to the staffing of community clinics, Albee says that we need four clinics per 100,000 people. To obtain such a ratio, by 1965 we would need 6,000 new psychiatritts (*36*).

There is growing realization of the need for psychiatrists to staff residential treatment units for psychotic and near psychotic children (*37*) (*38*). Barton notes the teaching and staff positions which remain unfilled in the area of mental retardation (*39*).

There is also a dearth of psychiatrists interested in the preventive aspects of the field. In discussing industrial psychiatry, Proctor states that the opportunities in this field are unlimited . . . (*40*).

". . . The number of positions available and unfilled in the field give some further measure of need. In the classified notices published by the American Psychiatric Association for its membership, the median number of positions offered each month is 150 and the ratio of total positions offered to total situations wanted is 23 to 1 (*41*).

Radiology

"The steadily growing need for radiologists, the complexity and increasing refinement of their techniques, and the declining number of graduates being trained in this specialty create an alarming problem for the Nation's hospitals and medical centers. Both the quality and quantity of medical care are seriously threatened unless more trained radiologists are available . . . The disturbing fact is, however, that there are not now, and probably will not be in the foreseeable future, a sufficient number of these specialists to perform the required work. . . . The total number of graduates who accepted residencies in radiology declined from 1,591 in 1961 to 1,491 in 1963, and percentage of residencies filled from 82 percent to 76 for the same period" (*42*).

". . . What happens now and in the future in urban communities will depend, in large part, on those radiologists who recognize the cardiovascular needs of the community and are willing to accept the responsibility of establishing the service and performing the procedures. For years, the need for the radiologist to assume a physician's mantle has been emphasized in the radiologic literature" (*43*).

"At the clinical level there is already a short supply of therapeutic radiologists, particularly of those qualified in the use of megavoltage equipment. Further, there is an expanding need for well-trained clinical investigators and medical scientists to bridge the gap between basic science and clinical application" (*44*).

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Appendix D

Appendix table 1.—*Graduates of foreign medical schools newly licensed in the United States and those serving on hospital house staffs: 1950–65*

Year	New licentiates [1]		Hospital house staff	
	Number	Percent of total	Number	Percent of total
1950	508	8	2,072	10
1955	1,107	14	5,036	17
1960	1,619	20	9,457	25
1965	1,688	19	10,974	27

[1] Includes an estimated 200 graduates a year of Canadian medical schools.

Source: Council on Medical Education, Americal Medical Association. "Medical Licensure Statistics for 1965." J. American Medical Association 196: 857–906, June 6, 1966.

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Appendix table 2.—*Immigrants admitted to the United States, selected health occupations:* 1960–66

Occupation	1960	1961	1962	1963	1964	1965	1966
Physician	1,574	1,683	1,797	2,093	2,249	2,012	2,552
Dentist	110	119	115	177	160	182	209
Nurse—R.N.	3,828	3,449	3,700	4,355	4,230	4,247	3,574
Practical nurse	182	126	124	153	193	225	105
Midwife	0	0	47	59	46	56	57
Dietitian, nutritionist	58	63	48	82	93	66	89
Pharmacist	134	177	225	206	267	276	262
Veterinarian	28	40	70	52	63	69	63
Therapists and healers, n.e.c.	140	138	166	159	188	207	158
Optician, lens grinder, and polisher	32	39	50	50	65	60	(1)

[1] Data not available.

Note: Figures include some already in the United States who were granted an adjustment of status to that of permanent resident.

Source: U.S. Department of Justice, Immigration and Naturalization Service. Annual Reports.

APPENDIX TABLE 3.—*Number of persons in the health services industry: 1940–75*

Year	Workers in health services industry		
	Total	Hospitals	Other
1940	1,059,000	(1)	(1)
1950	1,698,900	1,009,000	689,900
1960	2,642,300	1,726,600	915,700
1966	[2] 3,672,000	(1)	(1)
1975	[2] 5,350,000	(1)	(1)

[1] Data not available.

[2] Estimated by Bureau of Labor Statistics.

Source: U.S. Bureau of the Census. "Comparative Occupation Statistics for the United States, 1870 to 1940." Washington, U.S. Government Printing Office, 1943, 206 pp.

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APPENDIX TABLE 4.—*Population of the United States, by age: 1930–65 and estimates 1970–80*

(In thousands)

Year	All ages [1]	Under 15	15–64	65 and over
1930	123,077	36,003	80,369	6,705
1940	132,122	32,942	90,150	9,031
1950	152,271	40,998	98,877	12,397
1960	180,676	56,099	107,917	16,658
1965	194,583	59,909	116,519	18,156
1970	207,326	61,286	126,454	19,585
1975	223,785	65,275	137,351	21,159
1980	243,291	72,798	147,428	23,063

[1] Figures may not add because of rounding.

Source: U.S. Bureau of the Census. "Current Population Reports." P–25, Nos. 279, 311, and 359. Washington, U.S. Government Printing Office, 1964 and 1965.

APPENDIX TABLE 5.—*Type of practice of physicians (M.D.): 1950–65*

Type of practice	1950	1955	1960	1965
Total	219,997	241,711	260,484	292,088
Active	208,997	228,553	247,257	277,575
Private practice	158,189	159,371	168,142	180,752
Family practice [1]	116,400	(2)	(2)	98,109
Nonprivate practice [3]	16,816	25,197	27,341	34,403
Training programs	21,416	31,028	37,562	43,508
Federal	12,576	12,957	14,212	18,912
Retired, not in practice	11,000	13,158	13,227	14,513
Rate per 100,000 civilian population:				
Private practice	103.0	95.4	92.2	92.0
Family practice [1]	75.8	(2)	(2)	50.0

[1] Includes general practitioners, internists, and pediatricians.

[2] Data not available.

[3] Includes teaching, research, public health, industry, etc.

Source: "Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp.

APPENDIX TABLE 6.—*Physicians per 100,000 population served, average in 6 medical groups providing prepaid medical services, by specialty*

Specialty	Average physicians per 100,000 population served	
	Mean	Median
Total [1]	109.4	....
Internal medicine	45.2	44.9
Allergy	1.6	1.4
Dermatology	2.8	2.5
Pediatrics	18.0	15.8
Obstetrics	9.1	8.0
Orthopedics	3.2	3.0
Ophthalmology	3.7	3.3
Otolaryngology	4.6	3.5
Surgery	6.5	6.7
Urology	1.9	1.5
Radiology	4.4	4.0
Physical medicine [2]	1.3	1.0
Anesthesiology [2]	1.5	1.5
Pathology [2]	1.8	1.6
Neurology	1.0	1.0
Psychiatry	2.8	1.5

[1] Exclusive of interns and residents in hospitals.

[2] Physical medicine based on 3 groups; anesthesiology based on 2 groups; pathology and neurology based on 4 groups. These services are provided in the remaining groups in other ways.

Source: Based on unpublished data for different years from the Kaiser Foundation (2 groups), HIP, Montefiore, Group Health Association (D.C.), and Rip Van Winkle.

Appendix table 7.—*Field of employment of nurses—R.N.: 1956, 1960, 1966*

Field of employment	1956 [1]	1960 [2]	1966 [2]
Total	430,000	504,000	640,000
Hospitals and other institutions	265,800	325,000	431,000
Public health and school health	27,200	32,400	41,500
Nursing education	10,400	14,200	22,700
Occupational health	17,000	18,500	19,500
Private duty, doctors' offices, other	109,600	113,900	124,000

[1] Includes 48 States and the District of Columbia.

[2] Includes 50 States and the District of Columbia.

Source: Health Manpower Source Book 2. "Nursing Personnel". Public Health Service Pub. No. 263, sec. 2 (revised). Washington, U.S. Government Printing Office, 1966, 113 pp. and Division of Nursing.

Appendix table 8.—*Percent of population 10–34 years of age enrolled in school, by age: 1947–65*

Year	Age group						
	10–13	14 and 15	16 and 17	18 and 19	20–24	25–29	30–34
1947	98.6	91.6	67.6	24.3	10.2	3.0	1.0
1950	98.6	94.7	71.3	29.4	9.0	3.0	.9
1955	99.2	95.9	77.4	31.5	11.1	4.2	1.6
1960	99.5	97.8	82.6	38.5	13.1	4.9	2.4
1962	99.3	98.0	84.3	41.8	15.6	5.0	2.6
1964	99.0	98.6	87.7	41.6	16.8	5.2	2.6
1965	99.4	98.9	87.4	46.3	19.0	6.1	3.2

Source: Bureau of the Census. Current Population Reports. "Population Characteristics." P–20, No. 162, Mar. 24, 1967.

APPENDIX TABLE 9.—*Annual graduates for selected health occupations: 1940–75*

Year	Physicians		Dentists	Nurses—R.N.			Practical nurses	Dental hygienists	Medical record librarians	Medical technologists	Occupational therapists	Physical therapists	Radiologic technologists
	M.D.	D.O.		Baccalaureate	Diploma	Associate degree							
1940......	5,097	447	1,757	....	23,600	....	(1)	430	58	(1)	(1)	(1)	(1)
1950......	5,553	373	2,565	....	25,790	....	3,000	529	83	2,011	391	627	923
1955......	6,977	459	3,081	2,704	25,826	199	9,694	857	137	1,956	469	634	(1)
1960......	7,081	427	3,253	4,136	25,188	789	16,491	992	137	2,573	414	675	2,285
1961......	6,994	506	3,290	4,039	25,311	917	16,635	1,023	139	2,809	355	675	(1)
1962......	7,168	362	3,207	4,300	25,727	1,159	18,106	1,219	152	2,856	302	689	2,315
1963......	7,264	362	3,233	4,481	26,438	1,479	19,621	1,257	142	3,259	364	757	2,722
1964......	7,336	354	3,213	5,059	28,238	1,962	22,761	1,429	161	2,679	471	891	2,887
1965......	7,409	395	3,181	5,381	26,795	2,510	24,331	1,491	180	3,283	550	900	3,158
1966.....	7,574	369	3,198	5,498	26,278	3,349	25,688	1,650	(1)	(1)	(1)	(1)	(1)
1970	8,500	450	3,900	9,000	28,600	9,500	39,000	(1)	(1)	(1)	(1)	(1)	(1)
1975	10,200	500	4,900	15,600	31,100	15,600	62,800	(1)	(1)	(1)	(1)	(1)	(1)

[1] Data not available.

Source: "Health Resources Statistics: Health Manpower, 1965." Public Health Service Pub. No. 1509. Washington, U.S. Government Printing Office, 1966, 182 pp. and unpublished data.

Appendix table 10.—*Number of graduates of programs in selected health professions, by geographic division, State, and program: 1966*

Geographic division and State	Medicine and osteopathy	Dentistry	Nursing—R.N.				Practical nursing
			Total	Baccalaureate	Diploma	Associate	
United States [1]	7,943	3,198	35,125	5,498	26,278	3,349	25,679
New England	437	102	3,378	423	2,837	118	1,723
Connecticut	72	0	771	97	660	14	343
Maine	0	0	151	11	140	0	83
Massachusetts	320	102	1,907	228	1,605	74	1,036
New Hampshire	0	0	187	19	168	0	104
Rhode Island	0	0	247	39	208	0	98
Vermont	45	0	115	29	56	30	59
Middle Atlantic	1,764	629	8,965	853	7,335	777	4,936
New Jersey	70	75	1,064	27	995	42	589
New York	964	239	4,469	655	3,151	663	2,822
Pennsylvania	730	315	3,432	171	3,189	72	1,525
South Atlantic	1,220	459	4,252	825	2,979	448	3,219
Delaware	0	0	110	14	96	0	50
District of Columbia	281	150	238	84	154	0	132
Florida	124	0	675	175	218	282	666
Georgia	163	72	618	82	512	24	463
Maryland	193	101	614	123	491	0	227
North Carolina	195	44	745	158	556	31	576
South Carolina	68	0	288	30	232	26	274
Virginia	142	61	609	100	478	31	636
West Virginia	54	31	355	59	242	54	195
East South Central	568	235	1,465	231	1,093	141	1,712
Alabama	68	47	410	59	351	0	395
Kentucky	156	69	384	63	273	48	397
Mississippi	68	0	182	23	85	74	240
Tennessee	276	119	489	86	384	19	680
West South Central	695	235	1,358	405	880	73	2,710
Arkansas	79	0	113	16	97	0	328
Louisiana	236	55	293	95	179	19	301
Oklahoma	95	0	209	44	150	15	221
Texas	285	180	743	250	454	39	1,860
East North Central	1,476	718	7,649	1,008	6,258	383	5,205
Illinois	567	202	2,420	189	2,157	74	1,303
Indiana	171	83	989	164	713	112	516
Michigan	263	143	1,278	244	876	158	1,479
Ohio	307	187	2,088	266	1,783	39	1,404
Wisconsin	168	103	874	145	729	0	503

See footnote at end of table.

APPENDIX TABLE 10.—*Number of graduates of programs in selected health professions, by geographic division, State, and program: 1966*—Con.

Geographic division and State	Medicine and osteopathy	Dentistry	Nursing—R.N.				Practical nursing
			Total	Baccalaureate	Diploma	Associate	
West North Central	1, 000	433	4, 153	678	3, 279	196	2, 419
Iowa	176	54	684	91	578	15	426
Kansas	110	0	439	60	379	0	229
Minnesota	135	95	1, 242	245	858	139	763
Missouri	430	209	913	118	764	31	527
Nebraska	149	75	432	50	382	0	187
North Dakota	0	0	226	59	167	0	181
South Dakota	0	0	217	55	151	11	106
Mountain	114	0	943	307	393	243	857
Arizona	0	0	206	47	113	46	121
Colorado	70	0	269	81	145	43	262
Idaho	0	0	69	9	18	42	133
Montana	0	0	122	35	58	29	75
Nevada	0	0	14	14	0	0	67
New Mexico	0	0	32	23	9	0	119
Utah	44	0	206	73	50	83	53
Wyoming	0	0	25	25	0	0	27
Pacific	622	370	2, 746	758	1, 018	970	2, 545
Alaska	0	0	0	0	0	0	16)
California	463	246	1, 904	436	597	871	1, 607
Hawaii	0	0	90	25	56	9	50
Oregon	78	69	262	89	173	0	227
Washington	81	55	490	208	192	90	645
Puerto Rico	47	17	216	10	206	0	353

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[1] Includes Puerto Rico.

Source: Medical Education in the United States 1965–66. *Journal of the American Medical Association* 198: 847–938, Nov. 21, 1966.

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APPENDIX TABLE 11.—*Graduates of programs in selected health professions in relation to population, by geographic division, State, and program: 1966*

Geographic division and State	Population (1,000's)	Graduates per 100,000 population						
		Medicine and osteopathy	Dentistry	Nursing—R.N.				Practical nursing
				Total	Baccalaureate	Diploma	Associate	
United States [1]	198,525	4.0	1.6	17.7	2.8	13.2	1.7	12.9
New England	11,224	3.9	.9	30.1	3.8	25.3	1.0	15.4
Connecticut	2,875	2.5	0	26.8	3.4	22.9	.5	11.9
Maine	983	0	0	15.4	1.1	14.3	0	8.4
Massachusetts	5,383	5.9	1.9	35.4	4.2	29.8	1.4	19.2
New Hampshire	681	0	0	27.5	2.8	24.7	0	15.3
Rhode Island	898	0	0	27.5	4.3	23.2	0	10 9
Vermont	405	11.1	0	28.4	7.2	13.8	7.4	14.6
Middle Atlantic	36,738	4.8	1.7	24.4	2.3	20.0	2.1	13.4
New Jersey	6,898	1.0	1.1	15.4	.4	14.4	.6	8.5
New York	18,258	5.3	1.3	24.5	3.6	17.3	3.6	15.5
Pennsylvania	11,582	6.3	2.7	29.6	1.5	27.5	.6	13.2
South Atlantic	29,220	4.2	1.6	14.6	2.8	10.2	1.6	11.0
Delaware	512	0	0	21.5	2.7	18.8	0	9.8
District of Columbia	808	34.8	18.6	29.5	10.4	19.1	0	16.3
Florida	5,941	2.1	0	11.4	2.9	3.7	4.8	11.2
Georgia	4,459	3.7	1.6	13.9	1.9	11.5	.5	10.4
Maryland	3,613	5.3	2.8	17.0	3.4	13.6	0	6.3
North Carolina	5,000	3.9	.9	14.9	3.2	11.1	.6	11.5
South Carolina	2,586	2.6	0	11.1	1.1	9.0	1.0	10.6
Virginia	4,507	3.2	1.4	13.5	2.2	10.6	.7	14.1
West Virginia	1,794	3.0	1.7	19.8	3.3	13.5	3.0	10.9
East South Central	12,910	4.4	1.8	11.3	1.8	8.4	1.1	13.3
Alabama	3,517	1.9	1.3	11.7	1.7	10.0	0	11.2
Kentucky	3,183	4.9	2.2	12.1	2.0	8.6	1.5	12.5
Mississippi	2,327	2.9	0	7.8	1.0	3.6	3.2	10.3
Tennessee	3,883	7.1	3.1	12.6	2.2	9.9	.5	17.5
West South Central	18,768	3.7	1.3	7.2	2.1	4.7	.4	14.4
Arkansas	1,955	4.0	0	5.8	.8	5.0	0	16.8
Louisiana	3,603	6.6	1.5	8.1	2.6	5.0	.5	8.4
Oklahoma	2,458	3.9	0	8.5	1.8	6.1	.6	9.0
Texas	10,752	2.7	1.7	6.9	2.3	4.2	.4	17.3
East North Central	38,480	3.8	1.9	19.9	2.6	16.3	1.0	13.5
Illinois	10,722	5.3	1.9	22.6	1.8	20.1	.7	12.2
Indiana	4,918	3.5	1.7	20.1	3.3	14.5	2.3	10.5
Michigan	8,374	3.1	1.7	15.3	2.9	10.5	1.9	17.7
Ohio	10,305	3.0	1.8	20.3	2.6	17.3	.4	13.6
Wisconsin	4,161	4.0	2.5	21.0	3.5	17.5	0	12.1

See footnote at end of table.

APPENDIX TABLE 11—*Graduates of programs in selected health professions in relation to population, by geographic division, State, and program: 1966*—Continued

Geographic division and State	Population (1,000's)	Graduates per 100,000 population						
		Medicine and osteopathy	Dentistry	Nursing—R.N.				Practical nursing
				Total	Baccalaureate	Diploma	Associate	
West North Central	15, 869	6.3	2.7	26.2	4.3	20.7	1.2	15.2
Iowa	2, 747	6.4	2.0	24.9	3.3	21.0	.6	15.5
Kansas	2, 250	4.9	0	19.5	2.7	16.8	0	10.2
Minnesota	3, 576	3.8	2.7	34.7	6.8	24.0	3.9	21.3
Missouri	4, 508	9.5	4.6	20.3	2.6	17.0	.7	11.7
Nebraska	1, 456	10.2	5.2	29.7	3.4	26.3	0	12.8
North Dakota	650	0	0	34.8	9.1	25.7	0	27.8
South Dakota	682	0	0	31.8	8.1	22.1	1.6	15.5
Mountain	7, 804	1.5	0	12.1	3.9	5.1	3.1	11.0
Arizona	1, 618	0	0	12.7	2.9	7.0	2.8	7.5
Colorado	1, 977	3.5	0	13.6	4.1	7.3	2.2	13.3
Idaho	694	0	0	9.9	1.3	2.6	6.0	19.2
Montana	702	0	0	17.4	5.0	8.3	4.1	10.7
Nevada	454	0	0	3.1	3.1	0	0	14.8
New Mexico	1, 022	0	0	3.1	2.2	.9	0	11.6
Utah	1, 008	4.4	0	20.4	7.2	5.0	8.2	5.3
Wyoming	329	0	0	7.6	7.6	0	0	8.2
Pacific	24, 843	2.5	1.5	11.1	3.1	4.1	3.9	10.2
Alaska	272	0	0	0	0	0	0	5.9
California	18, 918	2.4	1.3	10.1	2.3	3.2	4.6	8.5
Hawaii	718	0	0	12.5	3.5	7.8	1.2	7.0
Oregon	1, 955	4.0	3.5	13.4	4.6	8.8	0	11.6
Washington	2, 980	2.7	1.8	16.4	7.0	6.4	3.0	21.6
Puerto Rico	2, 668	1.8	.6	8.1	.4	7.7	0	13.2

[1] Includes Puerto Rico.

Source: Computed from data in appendix table 10.

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